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On the Diseases of the Icelanders.

BY DR. HENRY HOLLAND.

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THE poverty of the Icelanders, and the dispersion of their small community over so vast an extent of country, render it almost impossible that medical practitioners should obtain an independent subsistence in the island. To obviate, as far as possible, this evil, a small medical establishment is provided at the public expense; consisting of a superintendant physician, who has the title of Landphysicus, an apothecary, and five subordinate medical men, who are stationed in different parts of the island. The physician and apothecary are settled in the vicinity of Reikiavik; where a house, somewhat superior in size and accommodation to the common class of Icelandic habitations, is provided for their reception. Independently of this provision, and the use of some land annexed to the house, the landphysicus has an annual salary of 600 rix-dollars, with the liberty to avail himself of the profits of any practice which his situation may afford. The present possessor of the office is Dr. Klog, a native of Iceland, but educated at Copenhagen. Of the country practitioners, one is stationed on the southern coast of the island, another on the eastern coast, a third on the

northern, and two in the western province. The reader will readily conceive how entirely destitute of medical assistance many parts of the country must be, when it is mentioned, that some of these districts, subject to the care of a single individual, extend nearly 200 miles along the coast, with a breadth varying from ten to thirty miles. We had the opportunity, while in Iceland, of seeing two of the country practitioners; both very respectable men, and well informed in their profession. One of them, Mr. Paulson, has already been noticed, as possessing a more extensive knowledge of natural history than any of his countrymen.

With the exception of three hospitals, in which a few incurable lepers receive gratuitous support, no medical institution exists on the island. These hospitals are maintained at the public expense, and in a method worthy of being noticed, from its singularity. On a certain specified day, at that time of the year when the fishery on the coast is most abundant and successful, every fishing-boat in the island is required to contribute one man's share of the capture that has been made; a provision is added to the law, that, if the number of fish taken by any boat on this day does not afford a share of five to each fisherman, the contribution to the hospitals shall be delayed until the next time, when the produce of a day's fishing equals or exceeds this amount.

In speaking of the diseases of Iceland, it will be necessary to allude only to those which furnish any facts peculiar and interesting, or which are more especially connected with the climate and mode of living among the inhabitants.

The diet of the Icelanders consists almost solely of animal food; of which fish, either fresh or dried, forms by far the largest proportion. During the summer, they have milk and butter in considerable abundance; but of bread, and every other vegetable food, there is the utmost scarcity; and, among the lower classes, an almost entire privation. The want of cleanliness in the personal and domestic habits of the people, has been frequently alluded to; it is an evil incident to their situation, the removal of which could probably only be accomplished by the sacrifice of other habits, still more essential to their comfortable existence. As an effect of these circum-

stances in the mode of life of the Icelanders, cutaneous diseases, arising from a cachectic state of the body, are exceedingly frequent among them, and appear under some of their worst forms. Scurvy and leprosy are common in the island, occuring especially in the districts of Gutbringe and Snæfell Syssols, and on other parts of the western coast, where the inhabitants depend chiefly upon fishing, and where the pastures are inferior in extent and produce. The scurvy (*kreppusot*), as it appears in Iceland, presents no remarkable peculiarity of symptoms. The disease is observed to occur with greater frequency at those periods when there has been a deficiency of food among the inhabitants, or when the snow and frost of the winter succeed immediately to a wet autumnal season. For its cure a vegetable diet is employed, in as far as the circumstances of the Icelanders will allow of such means. Fruits of every kind are altogether wanting to them; but some advantage is derived from the employment of the cochlearia (*officinalis et darica*), of the *trifolium repens*, of the berries and tops of the *juniperus communis*, and of the *sedum acre;* plants which are indigenous in the island.

The leprosy of the Icelanders (*likthra*, *holdsveike*, or *spitelska*,) exhibits, in many instances, all the essential characters of the genuine elephantiasis, or lepra arabum; and is a disease of the most formidable and distressing kind. Indolent tumors of the face and limbs are generally among the first symptoms of the complaint, attended by swellings of the salivary, inguinal, and axillary, glands. The nostrils, ears, and lips, are progressively affected with swelling and deformity. The skin over the whole, or different parts of the body, becomes thick and hard, sometimes exhibiting a shining or unctuous surface, sometimes one rough and scabrous; which, at a more advanced period of the disease, displays numerous cracks or fissures. The senses are usually much enfeebled, and anæsthesia of the extremities generally occurs. The voice assumes a peculiar hoarseness and nasal tone, frequently with swelling of the tonsils, but without any hindrance of deglutition, until the disease has made a great progress in the habit of the patient: the breath and perspired matter are extremely fœtid; and the hairs and nails frequently fall off. The tumors in the different parts of

the body gradually pass into malignant ulcers, which discharge an acrid unhealthy matter. In this state the patient often lingers during a long life; or, when the disease has a more speedy termination, all the symptoms are rapidly aggravated, and he is carried off in a state of extreme debility and wretchedness.*

When it is considered how frequently unsuccessful the treatment of this disease is in more auspicious regions, it will not excite surprise that in Iceland the attempt at cure should generally be unavailing, where, from the situation of the patient, medical assistance can be obtained. Laxatives, diaphoretics, and issues, or sometimes even venesection, are employed in the earlier stages, or with a prophylactic view. The indigenous plants which the natives employ as remedies, are, the juniper, the *vaccinium myrtillus*, the *rhodiolarosea*, and the *dryas octopetala;* the latter of which, particularly, grows in great abundance on the island. These remedies, however, appear to be of little avail in relieving any of the urgent symptoms of the disease.

It does not appear that any distinct record exists in Iceland of the first appearance of the leprosy in this country. The Chevalier Bach, in his letter to Dr. Van Troil on the subject, thinks it probable that the disease was brought into Iceland from Asia or the South of Europe, at the time of the crusades; in which he asserts, that these Icelanders bore a part with the other nations of Europe.† From the Ecclesiastical History of Iceland, it appears that the latter statement is not well founded; but though not participating in the holy wars, the Icelanders had at this period an intimate connection with the European continent; and the disease of which we are speaking, when once introduced, would readily be kept up, partly by its contagious character, principally perhaps by the food and personal habits of the people. In the rest of Europe it has gradually disappeared, in consequence of the progressive improvement in the modes of living among every class of society.

* This Icelandic disease is said to be the same with the Elephantiasis of Cullen, the E. legitima of Sauvages; and agrees very exactly with that described by Dr. T. Heberden (Lond. Med. Trans. vol. i.) as occurring in the island of Madeira.

† Van Troil's Letters on Iceland.

The ravages committed by the small-pox in Iceland have been so much as to render this disease important even in the political history of the island. Introduced from the continent at different periods, and these in general distant from each other, it has spread rapidly, and under its most virulent form; producing effects almost unexampled in the history of this dreadful disease. The most remarkable instance of this kind occurred in 1707; during which year the mortality amounted, according to the most accurate estimate, to about 16,000 souls; more than a fourth part of the whole population at that period. Several similar instances are recorded in the history of Iceland, though none attended with effects so extremely disastrous. A few years ago the vaccine matter was introduced into this island from Denmark; but, owing to the smallness of the population, and its dispersion over so wide a surface, this was soon lost again; and, at the time of our arrival (in May 1810), we found the practice of inoculation (vaccination) entirely suspended. In contemplation of this circumstance, we had taken out with us a few vaccine crusts, with the design of recommending the method lately proposed by Mr. Bryce. Almost immediately on our arrival, we inoculated several children at Reikiavit, and afterwards in other parts of the country; and, having a communication with the landphysicus on the subject, we had the satisfaction of knowing, before we returned to Britain, that the vaccine crust had found its way into every part of the island. The adoption of the plan of inoculating from the crusts, will doubtless secure to the inhabitants a permanent continuance of this blessing.

The Icelanders have occasionally suffered much from the measles, as well as from the small-pox; in 1797 six hundred people were carried off by this disease.

Syphilis cannot be said to exist in Iceland. Single cases have sometimes occurred from communication with foreigners; but the disease has always been intercepted before it made any progress in the country.

Psora is an almost universal complaint in Iceland, appearing indiscriminately among all classes of the inhabitants. No discredit is attached to it, nor does it seem that any means of

cure are attempted, though the most efficacious remedy is found in so much abundance in the country.

Inflammatory visceral affections are very common among the Icelanders. The variable nature of the climate, and the constant exposure to wet and cold which is incurred in the occupation of fishing, give a strong tendency to pulmonary complaints; and, out of the annual number of deaths in the island, a very large proportion are referable to this cause. This fact was ascertained from the examination of certain statistical registers, which are annually drawn up by the priests of the several parishes, and transmitted to the bishop of Reikiavik. In these pulmonary affections, and especially in cases of phthisis, the *lichen icelandicus* is much employed by the natives; and possesses a reputation among them, which the experience of its effects in other countries would scarcely seem to warrant. As a demulcent remedy, however, it probably in some degree alleviates the symptoms; and, as an article of diet, in such cases its use may certainly be advantageous.

Inflammatory affections of the abdominal viscera are likewise very common among the Icelanders; chiefly, perhaps, in consequence of the peculiar nature of the diet to which they are accustomed. It is possible also that a disposition may be given to these complaints by the treatment of the children in their early infancy. A mother in Iceland seldom suckles her child; but nourishes it with cows' or sheep's milk, which the infant sucks from a piece of moistened rag, or a sponge. Where, from extreme poverty, or other circumstances, milk cannot be obtained, a little fish or flesh meat, rolled up in cloth and linen, and put into the infant's mouth, is the substitute most commonly employed. The diet of the Icelanders likewise gives much disposition to worms; and the ascarides are observed to be particularly frequent.

The climate and the occupations of the people, particularly that of fishing, render rheumatic affections very common. It is said that gout also occasionally occurs; but it may be doubted if it be not some modification of rheumatism which obtains this name.

Hypochondriasis is a frequent complaint among the natives of Iceland, induced probably by the physical circumstances of

their situation, and the long confinement to their habitations, which is necessary during the winter season. Yet the general temperament of the Icelanders does not appear to be a melancholic one, and the vivacity of their manner frequently forms a striking contrast to the wretchedness which their external condition displays.

Besides the diseases which have already been noticed, I had the opportunity, while in Iceland, of seeing cases of epilepsy, hysteria, amenorrhœa, menorrhagia, asthma, icterus, &c. No case of idiopathic fever, either intermittent or continued, occurred to my observation. With respect to intermittents, however, I was informed that they occasionally appear among the inhabitants under a well marked form; an effect, no doubt, of the vast extent of bogs and marshy ground, which are formed even in the most populous districts of the island.

A singular complaint remains to be noticed, the effects of which, though limited to a small spot, are eminently disastrous as far as they extend. This is the disease called *Ginklofe* by the Icelanders; the Tetanus or Trismus neonatorum of medical writers; which invades children at a very early age, and almost invariably proves fatal in its event. It occurs very rarely, if at all, on the mainland of Iceland; but is confined principally to the group of islands called Westmann-Eyar, situated on the southern coast.* The population of Heimacy does not amount at present to above two hundred souls, and is almost entirely supported by migration from the main land; scarcely a single instance has been known, during the last twenty years, of a child surviving the period of infancy. Dur-

* The Westmann islands consist entirely of lava. The nearest to the coast is about twelve miles distant; and the most remote about twice that distance. Only one of them, called *Heimacy*, is inhabited; and the people are by no means respected by their neighbours on the main land, who represent them as being remarkably indolent and depraved in their habits. Their food consists chiefly of fulmars and puffins (*Procellaria glacialis, et Alca arctica Linn.*), which are slightly salted and barrelled. This is the principal aliment of the people of St. Kilda, the most remote of the western islands of Scotland. The same peculiar and fatal disease attacks children in both places. Until the great volcanic eruption of 1783 took place, there was abundance of fish around the Westmann islands; but, since that period, the fishing on this coast is reported to be much less productive.

ing a great part of the year, the island is wholly inaccessible in consequence of storms, currents, and the nature of the coast. The inhabitants are therefore left almost solely to their own resources. The chief article of food is the sea-fowl, called *fulmar*, which they procure in vast abundance, using the eggs and the flesh of the bird, and salting the latter for their winter food. The destructive effects upon the fishery around these islands by the volcanic eruption of 1783, has deprived the inhabitants of this article of diet. Of vegetable food they have none; and there are only a few cows and sheep on the island.

The distressing consequences of this disease led the Danish government to give an official direction to the landphysicus of Iceland, to visit the Westmann islands, for the purpose of investigating its nature and causes. This gentleman went over to the islands during the summer of 1810, and remained three weeks on the spot. Though he did not himself see a case of the disease, he obtained all the principal facts connected with it from the priests, and those of the inhabitants who had had children. The symptoms of the complaint are briefly these. Very soon after birth, strabismus and rolling of the eyes are observed; subsultus tendinum occurs; and the muscles of the back are often drawn together and stiffened, evidently by incipient spasm. These appearances infallibly denote the approach and event of the disease. Having continued during a period varying from one to seven days after birth, trismus generally comes on, sometimes attended by opisthotonos, which is strictly called the *ginklofe;* occasionally with emprosthotonos, to which the name of *klums* is given by the natives. The trismus presently impedes deglutition, and, the paroxysms becoming more violent, the infant is carried off. When the rare event of a favorable termination occurs, it is portended by a critical diarrhœa, or by an exanthematous eruption, with the evacuation of the meconium.

The following table, which includes a period of twenty-five years, shews the mortality consequent upon this disease in the

Westmann islands; and exhibits the days also upon which death has happened.

Children.		Days.	Children.		Days.
1	lived	2	18	lived	9
3		3	10		10
14		4	2		11
16		5	1		12
22		6	1		13
75		7	5		14
16		8	1		21

It will be seen, from this Table, that the number of deaths on the 7th day greatly exceed those on any other; and also that they are more frequent on the 14th day, than on the days immediately preceding or succeeding it. From the proportion which these cases of fatal event bear to the whole population of the island, it is probable that few, if any, instances of recovery have occurred, during the period included in the Table. No methods of cure have hitherto been resorted to by the inhabitants.

This disease is well known to prevail in other parts of the world; and has been particularly described as it appears in the West Indies, and in the island of Minorca.* It exists also in Switzerland, and in some of the northern districts of Scotland; especially in the island of St. Kilda, the inhabitants of which, in their diet and mode of life, much resemble the natives of the Westmann islands. The exciting causes are involved in much obscurity. It may be presumed, however, that they must vary considerably, when the disease appears in countries so widely different, with respect to climate and the situation of the inhabitants. Its occurrence in the Westmann islands may reasonably be supposed to have some connection with the extraordinary diet of the natives; and this is the more probable, as it appears that the complaint has been much more frequent since their fishery was destroyed by the volcanic eruption in 1783. Independently of any effect which the peculiarity of the mother's constitution may have upon her offspring, the practice of given to the infant a strong and oily animal food

* Vid. Hillary, Chisholm, and Clarke, on the Diseases of the West Indies; and Cleghorn's Diseases of Minorca.

almost immediately after birth, will necessarily create irritation in the bowels, and dispose to spasmodic affections. Dr. Klog, in some remarks he gave me on this subject, attributes much to the effects of the sea air, and of a moist atmosphere; but, had these causes any considerable influence, we might expect that the disease would be more frequent in different parts of the world, than is actually found to be the case.

The age which the Icelanders usually attain, presents nothing remarkable in either extreme: from a table of population, it appears that in 1801, when the number of inhabitants was 47,207, there were 41 persons between the ages of 90 and 100; 443 between 80 and 90; and 1698 between 70 and 80. The number of females was 25,371: of males, only 21,746. The longevity of the females exceeds considerably that of the males; owing, no doubt, to their less exposure to the severities of labour, and the hardships of the climate. Of the 41 persons between 90 and 100, 35 were females; of those between 80 and 90, 285 were females, while the number of males was not more than 158. A comparison of facts would probably prove, that the longevity of the Icelanders rather exceeds, than falls short, of the average obtained from the continental nations of Europe.

The Icelanders are in general of a tall stature; arising, however, more from the length of the spine, than of the limbs: the head is of the middle size: the countenance open: the complexion exceedingly fair, and among the women often very florid. The hair is almost invariably of a light colour, and seldom curled. Corpulency is rarely observed among the natives of Iceland.—*Sir George Stuart Mackenzie's Travels.*

A case of Recovery from the Effects of Arsenic, with Remarks on a new Mode of detecting the Presence of this Metal. By Peter M. Roget, M. D. Physician to the Northern Dispensary, and late Physician to the Manchester Infirmary, Dispensary and Lunatic Hospital.

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The white oxyd of arsenic, when taken in sufficient quantity, is in general so violent and so certain a poison, that the following instance of recovery, after many formidable symptoms had appeared, will, perhaps, be not unworthy of the attention of this Society; more especially as the plan of treatment that was pursued, has not, as far as I can learn, been hitherto put in practice under similar circumstances. A girl, 19 years of age, of a sanguine temperament and delicate constitution, having met with a severe disappointment, formed the resolution of putting an end to her existence. With this intent, on the 12th of February last, she purchased sixty grains of white arsenic, and leaving her house at eight o'clock in the evening, that she might execute her purpose unobserved, she strewed the powder upon a piece of bread and butter, and eat the whole. In about ten minutes after she had swallowed the last portions, an effort to vomit took place; but only a small quantity of the bread was rejected from the stomach; and, during the remainder of her walk, no further vomiting occurred.

About an hour after she had taken the poison, she returned home, and her sister, observing that she looked exceedingly pale, inquired if she was well. She made a sign that she felt very ill, and hastened immediately to her bed. She had not lain down above a few minutes, before she was seized with violent pain in the stomach, which was soon followed by severe vomiting. The vomiting was fortunately promoted by large draughts of warm water, with which her mother supplied her, but which it required much persuasion to induce her to take: they were returned almost as soon as swallowed. It was at this period that, from the extreme agitation and distress which the patient appeared to suffer, the idea first occurred to her mother of her having possibly taken poison; but the young woman, whenever

questioned on the subject. denied the accusation with vehemence. The vomiting continued to recur from time to time, and was attended with considerable griping in the bowels, and with copious watery evacuations by stool. The fluid that was vomited was of a yellow or greenish colour, and, on two occasions, was observed to contain a small quantity of florid blood.

The anguish of the patient had now risen to such a pitch, that her resolution gave way to the urgent wish for relief, and she acknowledged the cause of her sufferings. An apothecary in the neighbourhood was immediately applied to, and, at about one o'clock in the morning, she took, by his directions, five grains of sulphur made up into a pill, together with three spoonsful of a mixture of ℥ss. of sulphate of magnesia, ℥i. of carbonate of potass, and a grain of tartarised antimony in ℥iii. of peppermint water. Of this mixture, three doses were taken in the course of the night, but none of them remained above a few seconds on her stomach. It is proper to notice, that some few hours afterwards, on emptying the vessel into which the patient had vomited, a quantity of white powder was found at the bottom involved in a glairy fluid. As this substance had been thrown away before I came, I had no opportunity of examining it.

About twelve o'clock on the following day (the 13th) the mother of this young woman applied to the northern Dispensary for assistance, and I went immediately to see her. She was suffering intense pain at the pit of the stomach, much increased by pressure, and accompanied with frequent retching, and occasional fits of vomiting. There was general tension over the abdomen. The face was flushed, the respiration hurried, anxious, and often interrupted by spasmodic catchings, approaching to hiccup. The pulse was 120, small, and extremely quick; the tongue white, but moist. The voice was tolerably firm, and the speech perfectly distinct and collected. I directed a vein to be opened in the arm, but could not procure a very full stream of blood. When about eighteen ounces had been obtained, the patient grew pale, complained of being sick, and vomited about half a pint of fluid of the appearance of thin gruel. Deliquium being at hand, the bleeding was stopped, and immediately afterwards the pulse ceased at the wrist, and the patient fainted. She remained about a quarter of an hour in a

state of insensibility; the pulse gradually returning, and beating 60 in a minute. In the course of an hour it had again risen to 120, but was much softer, slower, and more equable than before the venesection. The pain in the stomach was somewhat alleviated, and the sickness was entirely removed: the breathing was more tranquil; but the countenance continued exceedingly pale. The patient complained much of a feeling of excessive coldness, particularly in the extremities, although to the hand of another person, they appeared to be of the natural warmth. These sensations of chilliness recurred frequently in the course of the day.

I now ordered a large blister plaster to be placed over the region of the stomach.

I visited her again at five in the evening, along with my friend Dr. Marcet, and noted the following particulars. The pain in the stomach continues to be intense, and though it occasionally remits, at other times it returns with increased violence, and is attended with slight efforts to vomit: there is also much pain in the fore part of the head. She complains of a burning heat in the fauces, rendering deglutition painful; the mouth is clammy, and there is much thirst, although the secretion of saliva is considerable. The burning sensation descends into the stomach, and is diffused over the whole chest. The skin hot; the pulse 120, and wiry. Great uneasiness is felt on the approach of a candle to the eyes. The voice is stronger, and she appears to have, in a great measure, recovered from the sudden debility produced by the bleeding. But her mind is still agitated by the recollection of her misfortunes; and, notwithstanding the assurances that have been given to her, that the principal subject of her affliction would be done away if she recovered, she declares that her only wish is to end her anxieties in death. As she had no stool since the morning, I directed ℥i. of oleum Ricini to be given in divided doses.

At seven o'clock, she was seen by the apothecary of the Dispensary. He found her pulse at 140; she was anxious and restless; and conceiving that the blister plaster was the chief cause of her uneasiness, insisted on its being removed. In this wish she was indulged by her friends, who imagined that it was useless to torment her any longer. She complained of being very cold; and

on being raised in bed, that she might take some tea, suddenly fainted away, and continued in a state of syncope, with slight convulsions, for half an hour. When she came to herself, the Castor oil was given to her, and remained upon her stomach without exciting nausea. After this she had half an hour's sleep, but awoke with the pain as severe as before.

At eleven at night, I again called with Dr. Marcet. There have been more complete remissions of pain, tho' it is still occasionally violent, but unattended with any inclination to vomit. When severe, it is always relieved, and nausea repressed, by a draught of barley-water, of which fluid about a quart has been taken since six o'clock. In the intervals of pain, she is more tranquil, and much disposed to sleep. Her strength, however, appears to diminish: she has frequent hiccup, constant sensation of burning in the throat and stomach, and an extremely pallid countenance. The eyes are kept constantly closed from the uneasiness which light produces: the conjunctiva is pellucid, and the pupil contracts but slowly.

On calling the next morning (the 14th) at eight o'clock, I was told that at midnight she had had a violent attack of pain, and threw up about a tea cup full of fluid. Soon after this effort, the pain subsided, she became composed, and had three or four hours of continued and refreshing sleep. In the course of the night, she had a copious thin stool, in which globules of the Castor oil were visible. The blister has discharged abundantly. No appearance of buffy coat is exhibited by the blood drawn yesterday; the crassamentum is even softer than usual, and bears a large proportion to the serum. She is this morning quite free from sickness or pain in the stomach; takes tea and milk with relish; has more strength of voice, and bears the light much better than yesterday. The pulse is 112, and small. The colour has returned to her lips and cheeks: her spirits are revived, and she is now anxious to recover; a change that may partly be ascribed to fresh hopes having been held out to her, with respect to her future prospect in life, if she survived the effects of her rashness.

In the evening I found that no material change had occurred. She has had a strong disposition to sleep; but whenever it is indulged, she is disturbed with frightful dreams, and awakes

in much alarm. The least sudden noise occasions violent starting: the breathing is interrupted by frequent sighs, and involuntary catchings during inspiration. She has often the feeling of emptiness and sinking about the præcordia, which threatens syncope, and is generally relieved by taking liquids. The headach is distressing: the pulse 120, and soft: the skin somewhat hotter than natural. The ol. Ricini was ordered to be repeated, if she should have no spontaneous motion.

On calling early the next morning (the 15th), I found that she had passed a sleepless night; and that the headach, the oppression in breathing, and the sensation of sinking had considerably increased. At five in the morning, she took ℥i. of ol. Ricini, which in half an hour brought away a large quantity of feculent matter. She complains this morning, that the burning sensation of the throat, impeding deglutition, has returned; while at the same time, she has frequently the feeling of a stream of cold water running down the back. At times, darting pains are felt in the stomach, as if needles were passed through that organ. The pulse is 125, and very small: the tongue white, but not dry. There is a good deal of vertigo, and the eyes are again painfully affected by light.

Capt. statim aq. menth. pip. & mist. Camphor. fort. ana ʒij. cum aq. font. ℥ss. et repetatur secunda quâque horâ.

On my visiting her at one o'clock, she expressed herself much relieved by the camphorated julep: all the symptoms were alleviated, and the appetite returned. In the evening she took another dose of Castor oil; the operation of which was speedy, but accompanied with sharp pains in the lower part of the abdomen.

On the succeeding day (the 16th) the symptoms still continued, but in a milder degree. She had slept the whole of the night: the pulse was 100, and tongue cleaner. The darting pains of the stomach still at times recurred, and were extending to the left side of the chest. The cough was frequent, but more loose. Cold shiverings were occasionally felt, together with aching pains in the extremities, and a sensation of tingling in the skin. There was a great disposition to start on any sudden impression. Her appetite being good, she was tempted to eat

some animal food at dinner. In the evening she was more hot and feverish, and the pain of the side had somewhat increased.

The next morning (the 17th) I collected the following Report. The night has been passed with but little sleep, much restlessness, and alternate states of cold and heat. The pulse is 112, of moderate quickness; the tongue is loaded with a white fur. The pain under the margin of the ribs on the left side is constant and severe, and much aggravated by the cough, which has increased in violence. The bowels are free from pain, and there is no longer any sensation of sinking and oppression about the præcordia. The thirst is urgent, as well as the burning sensation in the throat. The vertigo and headach still continue, together with the pains in the limbs, and tingling in the skin.

The camphorated julep was now discontinued; seven leeches were applied to the side, where the pain was most felt; and a blister ordered to be laid on the same spot, after the leeches had performed their office. An ounce of ol. Ricini was directed to be taken in the evening.

At eight o'clock P. M. the pain in the side was somewhat easier: the cough was attended with expectoration. There was much thirst and occasional chills, followed by increased heat: the pulse was at 108: and the Castor oil had operated freely.

℞. Aq. ammon. acetat. ℥ss. Liquor. antimon. tart. ʒi. Mucilag. acaciæ. Aq. menth. Syrup. comm. ana ʒi. M. Capt. tertiis horis.

On the 18th, I learned that the pain and cough had increased in the fore part of the night, but were relieved on the breaking out of perspiration. The catamenia have made their appearance this morning. She has had a natural motion, has slept for above two hours since day-light, and finds herself at present considerably better. The pulse is 96, and soft. The expectoration is scanty and difficult.

Add. singul. dosibus mist. Oxymel. scill. ℥ss.

On the 19th, I found that she had slept well the preceding night. She is this morning quite free from pain: the cough continues to be troublesome, but the expectoration is more free. She complains of being very weak, and has occasionally the sensation of emptiness in the stomach. At ten o'clock in the evening, after having exerted herself in conversation on sub-

jects in which she was deeply interested, she had a return of pain in the left side; and, about eleven o'clock, suddenly went off in a fit, during which she was completely insensible; the left arm and leg were agitated with strong convulsions: there was considerable foaming at the mouth, which was drawn to the left side, while the other features of the face were much distorted, and frequently convulsed. These symptoms lasted nearly two hours; and during the remainder of the night the patient continued insensible, with occasional moaning and twitching in the limbs.

In the morning (the 20th), I found her lying in a comatose state, with the eyes closed, unable to answer questions or perform any movement unless when strongly roused. The pulse was 92, soft, and of equal strength in both wrists. The bowels were sufficiently open; there was no difficulty in swallowing: the pupils were somewhat dilated, but contracted on the admission of light. She sighed and moaned frequently, but otherwise the respiration was tranquil. On inquiring if she felt any uneasiness, she complained of violent headach, and also of pain on the left side of the abdomen, nearly in the region of the spleen, and she could not bear it to be pressed. There were occasional tremors in the limbs.

Applicetur emplastr. lyttæ abdomini quâ dolet; & capt. sextis horis, mist. camph. & aq. menth. ana ʒvj. cum spt. ammon. aromat. gutt. xv.

The account I collected the next day (the 21st) was, that she had a convulsive fit last night of the same kind, and occurring at the same hour as the preceding; and that she had continued since in a state of torpor. The bowels are regular. At two o'clock, P. M. of the same day, she was considerably revived; there was no longer any intolerance of light, and every uneasy sensation, excepting that of weakness, had vanished. The pulse was natural; the tongue nearly clean. In the evening she had some return of pain in the abdomen, but in a lower situation than before, and it was still accompanied with great tenderness on pressure. The part to which the blister plaster had been applied was free from pain. Relief was experienced from the mixture, which procured a discharge of flatus from the stomach.

Feb. 22. The convulsions did not return in the night, but at

eight this morning, she was attacked with a fit, which lasted till twelve. From this fit, her recovery, which happened in my presence, was more sudden than before. She seemed to awake from a sound sleep; she declared that she felt perfectly well, and was desirous of getting up and taking food. Her only complaints were of violent itching of the skin over the whole body, and of slight vertigo on attempting to sit up. In the evening she fell asleep, and soon after had a return of convulsive motions, which continued at intervals, during the greater part of the night. They were less violent, but more continued, than during the preceding day.

On the morning of the 23d, she made no complaint except of headach, itchiness of the skin, and burning sensation in the throat. The convulsions returned with violence about noon, and continued for an hour and a half: they no sooner ceased, however, than she again awoke free from complaint, excepting a violent itching of the nose, and a numbness in three of the fingers of the right hand.

On the 24th, and for several succeeding days, the convulsions still returned during sleep, but they gradually became milder, and at length amounted only to irregular twitchings of the tendons. On the 31st, these had entirely left her. The strength had in the mean time been improving, and the only symptoms which remained, were occasional flatulence and oppression of the stomach after meals; and sometimes dyspnœa, and a sense of pain and constriction across the lower part of the thorax. With the assistance of some antispasmodic medicines, these symptoms have been much relieved, but they are still apt to recur on any agitation of mind. Her natural appetite has returned, but she remains much thinner, and has by no means recovered the same degree of health and strength that she enjoyed before her desperate attempt upon her life.

In reasoning upon the phenomena recorded in the preceding narrative, many topics of inquiry might be suggested, and various conjectures formed as to the morbid states corresponding to each train of symptoms. But I shall not trespass upon the time of the Society any further than to state my ideas on the different conditions through which the patient passed, and

the views which led me to adopt the mode of treatment that was employed.

The case before us affords a proof of the possibility of recovery when an unusually large quantity of arsenic has been swallowed, and under very unfavourable circumstances: and it also furnishes arguments in favour of a mode of practice directed to the removal of the effects of the poison, when it would be in vain to attempt its immediate evacuation or destruction. The protracted nature of the case gives us the opportunity of observing distinctly the peculiar train of symptoms that are excited by this powerfully deleterious agent, and which are either obscurely discernible when a smaller quantity has acted upon the system, or confusedly blended together in those instances which run through a more rapid course.

We may remark, that the first operation of the arsenic, was that of a violent emetic and purgative; and to this circumstance I am inclined to think the patient owed her only chance of safety. These corresponding effects began to take place about an hour after its reception into the stomach, and were promoted by copious dilution, by which I should imagine that nearly the whole of the poison was evacuated. It appears, indeed, from the testimony of a number of authors,* that a few grains are in general sufficient to occasion death: had any considerable portion of the sixty grains, therefore, remained longer upon the stomach or intestines, the consequences would have been irretrievably fatal. From the analysis of the fluid vomited at the time I first saw the patient, and of which I shall afterwards give an account, it would appear that none of the arsenic was at that time present in the stomach.

But the impression which the poison had made upon the coats of the stomach, was not of a nature to subside on the removal of the cause that had produced it.† The inflammation

* See Dr. John Johnstone's Essay on Mineral Poisons, p. 21.

† This point is sufficiently established by the experiments of Dr. Bostock, which were made on the occasion of a remarkable trial for murder at Lancaster, and which are related in a pamphlet, entitled, "A Vindication of the Opinions delivered in Evidence by the Medical Witnesses for the Crown, &c. Liverpool, 1808;" and of which a further account is given in the Edinburgh Med. and Surg. Journal, vol. v. p. 14. Two dogs were killed by receiv-

excited in that organ, and the symptoms of which, at the time I first saw the patient, were strongly marked, would probably, if left to its natural course, have run through all its stages, and terminated in gangrene. I considered that dilution had been largely employed, and that the evacuations from the stomach and intestines had been abundant. The stomach was in so irritable a state, that no medicine could be exhibited with any prospect of advantage. I concluded that the principal and more immediate source of danger, consisted in the inflammation of the stomach; and viewing the matter in this light, was induced to adopt the treatment proper for idiopathic gastritis.* The bleeding was pushed to deliquium; a large blister plaster was applied to the epigastric region, and the bowels kept open by frequent doses of oleum Ricini. The employment of these remedies was productive, indeed, of great debility, which, however, was but temporary: the advantages procured were more permanent; these were the occasional remission of the pain, and the immediate cessation of the vomiting, which never afterwards returned, excepting once in the course of the following night. An effectual check was given to the inflammatory process; and a remission of the symptoms was obtained for about thirty-six hours; during which the system showed a tendency to return to its natural condition.

ing a metallic poison into the stomach, although the whole of the poisonous substance, as far as could be ascertained by the nicest chemical tests, had been evacuated previous to death; and dissection showed marks of inflammation in the coats of the stomach and intestines. I had an opportunity of observing a fact of a similar kind in a girl who was brought into the Manchester Infirmary, after having swallowed a large quantity of corrosive sublimate. I could not discover any of the metallic salt in what she had vomited, twenty-four hours after the poison was taken. She lived for ten days. I examined with great care the state of the primæ viæ, and although marks of high inflammation were visible in the stomach and duodenum, I could discover no traces of mercury in their contents, nor of any portion adhering to their inflamed coats.

* Since this paper was written, I have found that the employment of copious blood letting, in cases of poison from arsenic, had already been suggested by Dr Yelloly, on the principle of removing inflammation. "Analogy," says he, "seems to indicate its employment; but its particular fitness can only be determined by experience." Edinburgh Medical and Surgical Journal, vol. v. p. 393. I believe the case I have related is the first in which the experiment has been tried.

To this state of comparative convalescence, there succeeded a new train of symptoms, threatening danger of a different kind, but of no less magnitude than the former. These were of a nervous nature, apparently resulting from the sedative action of the poison upon the nervous system. To this cause may be referred the sense of coldness and numbness over the body, of void in the stomach; the somnolency, the severe headach, the tremors and convulsions; the anxiety, and constant tendency to fainting. These, conjoined with the deadly paleness of the countenance, inspired me with apprehensions that nature would sink under the struggle. Assistance might have been afforded by stimulant remedies; but these were contra-indicated by the presence of many symptoms of irritation in the throat and primæ viæ, by the sensation of burning heat in these parts, by the hardness of the pulse, and occasional sharp pains in the region of the stomach, which implied that a disposition to inflammation still existed. I therefore ventured only upon small doses of camphor with peppermint-water; and from these medicines relief was evidently experienced.

In the course of a day or two, the above-mentioned symptoms had subsided; but it was only to give place to another state of diseases of as formidable a kind. The pain in the stomach had gradually extended to the lungs, and was now accompanied with all the characters of pneumonic inflammation. Notwithstanding the exhausted condition of the patient, I had again recourse to the antiphlogistic treatment, conjoined with diaphoretics, and with the same success as before. The pneumonia was subdued, and weakness was all that remained.

It might now have been presumed that no further obstacle to recovery would arise, and that the arsenic had exhausted its power of doing mischief. The fallacy of such expectations was soon apparent. It was still lurking in the system, although some days elapsed without its exhibiting any marked effect. On a sudden its activity was again exerted, and a new order of symptoms of the convulsive kind were excited. The fits were completely epileptic, and were accompanied and followed by insensibility, which, in the beginning, was of such long duration, as to excite fears for the event. These apprehensions were dissipated by the fits becoming every day shorter, and the reco-

very from each more rapid and complete. In the course of a week they had entirely ceased, and the patient has since remained free from any urgent complaint; although the constitution has evidently been injured by the deleterious influence of the poison.

It will be seen, by referring to the history of the case, that most of the symptoms which are enumerated by authors, as the ordinary consequences of arsenic, were exemplified in the present instance. There are, however, some which appear to me to deserve particular notice, as I have reason to believe they are of unusual occurrence. These are, first, the severe pain in the forehead, which distressed the patient during several days: secondly, the great intolerance of light, that prevailed when the headach was most intense: thirdly, the various inflammatory affections of some of the viscera in the neighbourhood of the stomach, such as the lungs and spleen, which seemed to be secondary effects of the original affection of the stomach: and, lastly, epilepsy. This last disorder I do not find mentioned by any author that I have consulted, as one of the secondary effects of arsenic; convulsions being only noticed among the violent primary symptoms which lead to a speedy death.*

I shall beg leave to subjoin a few observations on the method of analysis that was employed, with a view of determining whether arsenic was contained in the fluid that was rejected from the stomach of this patient at the time that I first saw her. Dr. Marcet was so obliging as to assist me in this inquiry, and to him I am chiefly indebted for the following particulars.

The fluid, by being at rest for two or three days, had spontaneously separated into a thick mucilaginous sediment, and a clear supernatant liquor. The latter was filtered, and concentrated to very small bulk. It was then of a brownish hue, and manifestly acid. The application of the usual fluid tests, namely, of water impregnated with sulphuretted hydrogen gas, and of sulphate of copper, with the previous addition of carbo-

* Morgagni De Sedib. et Caus. Morb. LIX. 4. Lieutaud Hist. Anat. Med. Tom. 1. Obs. 154. Gmelin Apparat. Medicam. Vol. 1. p. 253. Epilepsy is sometimes a consequence of the poison of lead. It is mentioned as such by Dr. Warren, in the Medical Transactions, Vol. ii. p. 86; and also by Sir George Baker, Ibid. iii. 412.

nate of soda, did not give the slightest indications of the presence of the suspected metal. The thicker part of the contents of the stomach, evaporated to dryness, and thereby reduced to a spongy coaly mass, burned without emitting any arsenical fumes.

The negative conclusion, deducible from these experiments, is still better established by the result of our trials with another test, which occurred to Dr. Marcet while engaged in the examination of the substance in question, and which I am happy in having this opportunity of communicating to the Society. Let the fluid, suspected to contain arsenic be filtered: let the end of a glass rod, wetted with a solution of pure ammonia, be brought into contact with this fluid; and let a clean rod, similarly wetted with a solution of nitrate of silver, be brought into contact with the mixture. If the minutest quantity of arsenic be present, a precipitate of a bright yellow colour, inclining to orange, will appear at the point of contact, and will readily subside to the bottom of the vessel.*

In examining the circumstances attending the agency of this test, the following particulars were observed. On adding successively ammonia and nitrate of silver to distilled water, no precipitation takes place. Fowler's arsenical solution affords a precipitate of a yellow colour, similar in appearance to that produced by a solution of the white oxyd; but a solution of arsenic acid gives a precipitate of a red brick colour. The fixed alkalies, when substituted for ammonia, likewise produce a yellow precipitate; but the results are less distinct, since, in the circumstances in which the experiment is made, they decompose the nitrate of silver, an effect which ammonia does not produce. We found by comparative experiments, that the precipitates thrown down by the same re-agents, (namely, ammonia and nitrate of silver,) when either zinc, iron, copper, mercury, or lead was contained in the fluid, had an appearance totally different from that produced by arsenic; and that the latter could

* As this precipitate is soluble in ammonia, particular care should be taken to avoid adding it in excess; indeed, the quantity of either ammonia or nitrate of silver employed, can scarcely be too small for the purpose of detecting the presence of arsenic.

readily be detected by the same means, notwithstanding the presence of these metals. The salts of copper or lead, when previously mixed with a solution containing arsenic, occasioned no difference in the results. With a solution of oxymuriate of mercury, ammonia alone will occasion a white precipitate; but if arsenic be also present, on the addition of nitrate of silver, the precipitate immediately acquires a yellow colour. The efficacy of this compound test is not weakened, but, on the contrary, seems to be rather increased by the presence of sulphate of iron. Sulphate of zinc was not found to interfere with its operation, any otherwise than requiring a larger quantity of ammonia, in order to saturate the sulphuric acid; but when this has been effected, and the whole of the zinc precipitated, the addition of nitrate of silver produces the same yellow tint as in the other experiments. There is, therefore, reason to presume, that no admixture of metallic or other salts, will occasion ambiguity, or enable the arsenic to escape detection, when the above test is properly applied.*

Being curious to determine the limit of minutenes in the quantity of arsenic discoverable by this test, we dissolved a grain of white arsenic in a known quantity of distilled water, and by successive additions of water to determinate portions of this solution, prepared other solutions, containing respectively $\frac{1}{20000}$ $\frac{1}{200000}$ and $\frac{1}{2000000}$ of their weight of arsenic. By applying the test to a small quantity in a watch glass, we found that when it contained only one 25,000th of a grain of arsenic, the precipitate was of a bright yellow colour. It was still distinctly yellow when the quantity of arsenic was reduced by dilution to one 50,000th of a grain. When further diluted, the yellowness was gradually less and less discernible, and the precipitate appeared of a light blue. It retained this colour until its quantity became too minute for

* In referring to the different tests that have been recommended for the detection of arsenic, Dr. Marcet pointed out to me a paper, published in the Philosophical Magazine, for May, 1809, in which Mr. Hume has proposed boiling the suspected matter with a solution of carbonate of potash, and bringing into contact with it a stick of dry nitrate of silver; a method of proceeding, which is somewhat analogous to the one I have described, but which appears much less convenient in its practical application. See Henry's Experimental Chemistry, Vol. ii. p. 389.

observation. A blueish cloud was, however, very distinctly visible when the fluid examined contained only the 250,000th part of a grain of arsenic.*

If, along with the extraordinary degree of delicacy of this test, we take into consideration the extreme facility of applying it, and the greater convenience of operating upon fluids than upon solid bodies, as we are obliged to do when we have recourse to the usual methods, it appears decidedly entitled to preference. I would, therefore, wish to point it out as deserving the attention of analysts, whenever the existence or the absence of arsenic in any substance is the object of their research.

An Instance of an entire Want of Pulsation in the Arteries of paralytic Limbs.

BY JOHN STORER, M. D.*

[From the New London Medic l and Physical Journal, for August 1812.]

THE following case is rendered remarkable by the occurrence of a pathological fact, of a nature so curious, as to have called forth my observation to every circumstance connected with it.

Mrs. N——, a married lady, upwards of 50, and very corpulent, who had borne children, but ceased to menstruate several years, was taken in the last week of March, 1811, with symptoms of a fever of the mildest kind. These consisted chiefly of aching of the back and limbs, wandering pains in different parts of the body, a sense of general debility, heat,

* Dr. Bostock, in instituting a comparison between the different methods hitherto recommended for detecting minute portions of arsenic, says, that "he has no hesitation in giving it as his opinion, that the most convenient, the most delicate, and the most decisive process, is the one in which the green precipitate is formed by the addition of the sulphate of copper." And he states it as the result of his endeavours to discover the degree of minuteness to which this test is capable of being carried, that it could detect arsenic when it formed one 2400th of the weight of the fluid. Edinburgh Med. and Surg. Journal, Vol. V. pp. 174 and 170.

* Extracted from the Transactions of a Society for the Improvement of Medical and Chirurgical Knowledge, pp. 448. Read July 2, 1811.

and a pulse about 84 in the minute, exceeding its usual standard by 14 or 15; there was neither chilliness, headach, nor much thirst. After a few days, the fever had remissions, and the exacerbations were followed by sweating. In this way the fever continued till the 9th of April, when, the window of the bed-chamber having been left open the preceding night, during a severe frost, and while the patient was in a state of perspiration, she complained of frequent coughing, and of a considerable degree of pain in the right side of the chest. On the 10th, these symptoms were increased, and were accompanied with a bloody tinge in the expectoration, and a pulse about 90, distinct and full. After a copious bleeding, a blistering plaster to the pained part, and a continuance of saline medicines, which, from the commencement of the disease, had kept the bowels freely open, I found her on the 11th, without pain, or very nearly so. Her pulse was reduced to 80; the expectoration was free, but still had a bloody tinge, which continued for a few more days. On the 12th, 13th, and 14th, she seemed, to herself and to her attendants, to be gradually improving; she was able to sit up for five or six hours at a time, and her appetite began to return.

Early in the morning of the 15th, after a disturbed night, she was suddenly seized with an excruciating pain in the left shoulder, extending nearly to the elbow, and, at the same time, with a paralytic affection of the whole left side, but without any corresponding affection of the face or speech, or any disturbance of intellect. When I visited her at one o'clock of the afternoon, I found that the pain, after the application of warm flannels, had removed from the shoulder into the left leg, below the calf, and into the foot, where it continued with so much severity, as to produce frequent screaming. The hand and arm affected felt colder than natural to my touch. She had some capacity of moving the shoulder, but could scarcely move the fore-arm or hand. The left thigh and leg were in the same paralytic state, possessing a very obscure degree of sensation and motion; but the hand and foot were insensible even to the prick of a needle. So far this attack, except in respect to the pain in the parts, had nothing singular in it, bearing the character of an imperfect hemiplegia,

such as usually occurs where no apoplexy has preceded. On laying my finger on the left wrist to examine the pulse I was the more surprised to perceive no trace of pulsation, as the situation and size of the radial artery were quite familiar to me, having uniformly ascertained the state of the pulse in the left arm, at each of my visits during this illness, and having uniformly found the pulsations full and distinct. As this was the arm from which blood had been taken on the 10th, I requested to examine it at the elbow, suspecting that the ligature might have been left, and was so tight as to compress the artery; but there was no ligature, nor could any pulsation be discovered at the usual place where I knew the artery lay. For it happened that, at the patient's request, I had examined the part at the time I prescribed bleeding, to satisfy her mind that her corpulence would be no bar to the safety of that operation. I then made a similar examination at the axilla, and was convinced that the pulsations of the artery of the paralytic arm, from the axilla downwards, were quite extinct. To complete my surprise at a circumstance so new to me, I perceived the subclavian artery of the same side to beat distinctly, at 104 in the minute. I also ascertained this to be the real state of the pulse in the right radial and temporal arteries; and in all of them the beats were as full and distinct as in health. The singularity of this symptom led to an immediate examination of the left thigh and leg, and I was unable to perceive any trace of pulsation either at the ham or groin.

In a patient of such corpulence, it would be presumption in me to assert the entire absence of pulsation in the crural artery, with the same certainty that I am able to affirm it in the arm; and I am the less disposed to do this, because the arm was, at this time, considerably colder than any part of the lower limb.

It happened fortunately, that Mr. Basnett, the surgeon who attended the family, was present during this examination, and immediately satisfied himself, at my request, of its accuracy. Exclusively of the severe pain felt in the leg and foot, the patient complained of a sense of fullness and confusion, with obscure pain in the forehead. A dozen leeches were therefore directed to be applied to the temples and forehead, and warm

fomentations, to be followed by a stimulating liniment, were to be frequently rubbed on the paralytic limbs, particularly the leg and foot, so long as the pain continued. Pills containing calomel were administered, and a saline opening draught was directed to be taken every six hours.

On the 16th, I found that the leeches had occasioned a bleeding, and that complete relief from the disagreeable sensations and pain in the forehead had followed. The severe pain in the left leg and foot had abated the preceding evening, the bowels had been freely opened, and my patient expressed herself with great cheerfulness, at having passed a good night, and being in all respects much better. She could move the fingers of the left hand, although partially, and with some difficulty; the arm was moved with more ease, and she thought the feeling in it was more natural. The state of the leg was also improved, but she had little, if any, power of moving the foot. At this time she had no consciousness of general illness; her whole solicitude was directed to the recovery of the use of her limbs, and to the uneasiness she suffered from a sense of coldness in the arm, when exposed to the air, and which she therefore required to be kept constantly covered with flannels heated, or wrung out of a hot fomentation. The temperature of the arm, to my touch, was evidently lower than that of the rest of the body, although this did not perceptibly exceed the natural standard.

In respect to the pulse, every circumstance continued as on the day before. The same examination, made and repeated with attention, gave the same results. The right radial artery beat 104 or 5 with regularity and distinctness; so did the left subclavian; but in the course of the artery of the left arm no pulsation could be discovered, nor in the corresponding leg and thigh. Pills of rhubarb with ammonia were prescribed to be taken with the former draught; a blistering plaster was applied to the inside of the left leg, and the fomentation and liniment were continued.

On the 17th, there was an evident improvement, both in the motion and sensation of the paralytic limbs; the pulse at the right wrist beat as on the preceding day, but, in the left, all pulsation was as completely extinct as hitherto.

On the evening of the 18th, I found my patient still improving, particularly in the power of moving the affected parts. She had passed a quiet night, and perspired freely, except in the left arm, which continued colder than natural. The state of the lower limb, in respect to perspiration, could not be judged of, as it was generally covered with a warm fomentation. On this day she complained of acute pain on the inside of the left foot, and as she had experienced an attack of inflammation, which was considered as gouty, in one of her feet about six months before, she expected that this would prove a return of it; but there was neither swelling nor discoloration, and the pain disappeared the next day. Her bowels were, by the use of the last medicines, kept sufficiently open; her urine was in due quantity, and of a natural appearance. Her head was perfectly relieved; but the pulse at the right wrist still beat from 104 to 106 in the minute distinctly. This was so much beyond its natural standard, as to indicate some causes of internal irritation. She had, however, no constitutional complaint, except some remains of the cough and expectoration, which had come on in the preceding week. She had taken sufficient nourishment on the day before, without inconvenience.

An attentive examination of the artery, at the axilla, elbow, and wrist of the left arm, and of the arteries in the corresponding thigh and leg, ended, as before, in there being no perception of pulsation at any of those parts where it ought to have been felt. The pulsations of the left subclavian artery, which, on the 17th, were distinct, and synchronous with the right radial artery, were on this day felt less distinctly, although they might still be numbered. Mr. Basnett had visited the patient on both days, and made a report altogether corresponding with my observations.

On a deliberate review of the case, at this stage of it, I confess, that I felt myself under no small embarrassment, in regard to the expectation that might be formed of its final result. A familiar acquaintance with morbid appearances, for upwards of forty years, had furnished me with no instance of the cessation of pulsation in a paralytic limb; and I was unable to calculate its consequences. It was evident from the temperament,

and the natural hue of the skin of the affected arm, which was entirely free from swelling and vesication, that a certain degree of circulation subsisted; and flattered by a daily advancement in the motive and sentient powers of the limbs, I had hitherto indulged the hope, that, at each successive visit, I should have the satisfaction to discover a return of pulsation. The evident failure in the power and distinctness of pulsation in the left subclavian artery, which now appeared for the first time, damped these hopes. Still, my patient possessed her accustomed energy of voice and manner, and there was no other symptom that threatened life. The blister on the leg had risen well, and was healing with a good aspect. The plan of treatment was directed to be continued.

On the 19th. I visited Mrs. N. at one o'clock, P. M. and at my own request, was met by M. Butlin, Mr. Basnett's partner, who had not seen Mrs. N. during this illness. We entered successively upon a new and minute examination of the pulse. The pulsations at the right wrist were distinct, but more frequent, by two or three in the minute, than at any former period of the illness; those of the left subclavian artery had become so indistinct, that no account could be taken of them. Mr. Butlin could not be assured that he had felt them at all; but he was quite decided, that there was no pulsation in any part of the left brachial artery, or in the artery at the left ham.

Our patient had received us cheerfully, and spoke with energy and much satisfaction of the improvement in the limbs, which was indeed very considerable. She could now move the foot in all directions, with ease and rapidity, and support herself on the limb when out of bed. She had so far recovered the perfect use of her hand, as to be able to squeeze my finger with considerable force; the sensation was also more natural, although the whole arm was still too cold, both to her own feeling, and my touch. She had, however, become evidently more irritable and unquiet, requiring frequent change of posture. About the middle of the preceding night, she had begun to be affected with a kind of suspirium, or sob, which she compared to that produced by being plunged into a cold bath; this attacked her whenever she was dropping asleep, and aroused her with the alarm of immediate suffocation. She referred this

sensation to the region of the mediastinum; but, as soon as she was completely awake, it went off, and she was not sensible of any difficulty of breathing in the intervals. I observed, however, that her respiration was shorter and more hurried than hitherto, and that her countenance expressed more anxiety. Pills of rhubarb and squill were prescribed to be taken with the former draughts, and a blistering plaster was applied over the sternum. Soon after we quitted her, the restlessness increased, with occasional returns of the feeling of suffocation. She passed a very unquiet evening, being frequently taken out of bed, and expired at two o'clock in the morning of the 20th, while her attendants were in the act of assisting her into bed. As soon as the issue of this singular case was known, application was made for leave to inspect the body, which was refused.

On reviewing the history of a disease, involving a phænomenon so extraordinary, as the absence of pulsation in the principal artery of a paralytic limb, it is to be lamented, that we are deprived of that light, which an accurate inspection of the body after death might have afforded.

It seems to me, that there are but two hypotheses, upon which any rational conjecture can be founded, to account for the absence of pulsation in the arteries of a paralytic limb. The first of these is, that there exists some obstacle to the course of the blood in the arterial tube, arising either from a disease of the tube itself, or from some compressing power, acting upon it externally. It is impossible, however, in the case of Mrs. N———, to imagine any such cause, capable of exerting its influence at once on the brachial and crural arteries of one side, and on them only. But if the want of pulsation had even been confined to the upper extremity, any obstructing cause, acting within, or upon, the artery of the arm, to be consistent with the circumstances of the case, must have existed in some point between those parts of the artery, denominated subclavian and axillary, and there was certainly no external appearance to justify such a supposition. Neither would it account for the gradual failure of the pulsations of the subclavian, during the two last days of the disease. But, to this account of the matter, there is another, and to my mind a more weighty objection. There is positive evidence that the

cessation of pulsation in the arm took place within a few hours before or after the attack of hemiplegia; and this being proved, it seems fair to presume, that the two circumstances were connected. As experience is in this case out of the question, it would be extremely difficult to imagine any mechanical cause arising so suddenly, and of a nature so powerful, as to impede the flow of blood, without manifesting itself by some external appearance.

The other hypothesis is, that although it is admitted to be true, that the vital organs are generally exempt from the effects of paralysis, yet it seems more than probable, that, in certain rare instances, the arteries themselves are susceptible of palsy. If this notion should be thought admissible, it would at once give a complete explanation of all the phenomena, and would be equally applicable to the condition of the arm, whether we suppose the pulsations of the lower limb to have been obliterated or not.

If it be objected as an inconsistency in this hypothesis, that supposing a paralytic affection of the artery of the arm, depending on the same cause, and occurring at the same time, as that of the voluntary muscles, it seems wholly unaccountable, that the sensation and motion of the affected limbs should be gradually restored nearly to a perfect state, whilst the arterial palsy increased, so as finally to prove fatal; I may plead, in answer, the mystery which to this day, involves all those changes in the animal frame, that are known to depend upon the condition of the nervous power, and may add, that the nervous energy in the organs of vital motion is governed by laws, entirely distinct from those that guide the voluntary muscles.

Nottingham, June 26, 1811.

P. S. I flatter myself I may be indulged in annexing to this history a brief account of a case, which happened several years ago, but has only of late come to my knowledge. It has since been recounted to me by Mr. Vickers, surgeon, of Loughborough, who attended the patient, with a readiness and distinctness, which proved the deep impression it had made on his mind.

Mr. Lockwood, a farmer, of Barrow, in Leicestershire, about 60 years of age, remarkable for no peculiarities of constitution or habits, returned one morning from his accustomed ride round his farm, to breakfast with his family, at eight o'clock, in perfect health. Before he had finished, the hand which held the tea-cup, then at his mouth, dropped lifeless on the table. His observation was, "I do not feel ill, but this must be of consequence; let Mr. Vickers be sent for immediately." When Mr. Vickers arrived, which was within two hours after the seizure, he found the arm completely paralytic, and colder than natural. On examining the wrist, he could feel no pulse; neither did it ever return. The pulse in the other arm was still in a natural state, the beats being distinct, and not exceeding in frequency the healthy standard. He affirmed that he had no complaint to make, but the loss of the use of his arm. Mr. Vickers employed hot fomentations, stimulants, and friction, in the hope of restoring vitality to the affected limb, but without the least success. Its colour, which at first was only too pale, soon grew dusky, and this dingy appearance increased hourly, but without swelling or vesication. About four hours after the attack, his constitution showed signs of becoming affected. He complained of faintness and perspiration; the pulse was accelerated; his respiration grew frequent; and, at length, somewhat interrupted and laborious. Such was the rapid progress of the symptoms, that the surgeon did not leave him till he was in the act of breathing his last, which happened within six hours from his first seizure.

I will not multiply observations on this case, since, in it too we are deprived of the advantage, which might have arisen from dissection. Suffer me only to observe, that if this is to be considered as a case of spontaneous gangrene, it bears no resemblance to any that has occurred within my observation, or that I have ever seen described. Some examples of very rapid and fatal gangrene might be quoted, but none, I believe, where the sensation and motion of the part were previously and suddenly destroyed. If such were to be found, I should be disposed to consider them in the light that I view this, as instances of complete palsy, affecting equally the muscles and arteries of the limb, and proving so speedily fatal, because the

influence of a paralysis in this degree, on parts essential to life, may be reasonably supposed to be inconsistent with its prolongation.

After the preceding cases were read to the Society, Dr. Wells mentioned, that a similar one, with respect both to the principal symptoms, and termination, had been related to him by the late Dr. G. Fordyce, who had seen it along with Dr. Sequeira. At the desire of the Society, Dr. Wells afterwards applied to Dr. Sequeira, who was in consequence so kind as to furnish him with extracts from the notes which he had taken of it. From the information received in this way, and the communication of some additional circumstances, by an intimate friend of the deceased person, the following account has been compiled.

Mr. J. S———, an eminent merchant, aged 62 years, tall, of a ruddy complexion, and inclining to be corpulent; in general healthy, but subject to a cough and difficulty of breathing in the winter. One morning, in December, 1801, a few hours after the commencement of a great thaw, as he was proceeding on foot from Highgate to London, with a pair of tight boots on, came to a considerable puddle of water, to pass which, he jumped from a bank on one side of the road to a piece of hard ground. He felt immediately a disagreeable jar through his whole body, and was a little stunned, but did not fall. In a minute or two he was able to continue his walk to town, where he did his usual business that day, both in his Compting House, and on Change. On the evening of the following day he complained of a pain in his right foot, which a surgeon, whom he consulted concerning it, attributed to a sprain occasioned by his leap. About a week after, his right leg was attacked with pain and swelling; these symptoms were ascribed to gout, under which, or something like which, he had once formerly laboured. A pain in his lower belly soon followed, which went away, after his taking some opening medicine, and never returned. His winter cough, and difficulty of breathing, now came on; and as he found that they were more troublesome when he lay down than when he sat up, he used a bed-chair,

to enable him to sleep with the trunk of his body nearly erect. While things were in this state, he awoke one morning with an excruciating pain in his left arm; this was supposed to have arisen from the pressure of the bed-chair, which was too small for a person of his size. In the afternoon, the same arm became numb and motionless, immediately upon which the pain ceased. About the same time, the pain and swelling in the right leg disappeared. At the first visit which Dr. Sequeira made after the occurrence of the palsy, he was surprised to find, that no pulse could be felt in the paralytic limb. He was well acquainted with the patient, and had often felt the pulse before in both wrists. Being now very much alarmed, he requested that Dr. Fordyce might meet him in consultation. There were however, no other symptoms of danger than what were furnished by the state of the left arm; for the pulse in the arm was natural, in regard both to frequency and force; the patient was in good spirits, and in perfect possession of his mental faculties; and the skin of the affected limb retained its healthy colour, and, to the feel of Dr. Sequeira, its usual heat. When Dr. Fordyce saw the patient, he apprehended the approach of mortification, and advised the adoption of measures to prevent it. For two days no further alteration took place. On the morning of the third day, Mr. S. rose from his bed, in order to make use of a close-stool, which was in his bed-room; but before he could reach it, he was seized, according to the report of his nurse, the only person with him at that moment, with convulsions, and in a few minutes expired. The friend, however, of whom mention was formerly made, has told Dr. Wells, that he saw Mr. S. a minute or two before he died, as he happened to be in his house at the time he so suddenly became worse, and that he was then neither agitated in his limbs, nor discoloured in his face, but seemed to be in a faint.

The paralytic arm was examined on the following day by an excellent anatomist, who was unable to discover any organic disease in the bloodvessels, or any other part of it. The relations would not permit him to open the head, thorax or abdomen.

Dr. Wells also recollects Dr. Fordyce's mentioning, that he had ascertained, by an experiment, that notwithstanding there was no pulse in the left arm, the blood still moved

through its arteries and veins. The experiment, Dr. Wells thinks, was the following: he compressed a large vein of the arm with one of his thumbs, and, with the other, forced upwards the blood contained in an inch or two of the same vein immediately above the compressed point. The part of the vein lying between the two thumbs being now empty, he lifted the lower one, and instantly the portion of the vein, which had been empty, became full.

Observations and Experiments on Vision.

BY WILLIAM CHARLES WELLS, M. D. F. R. S.

[From Nicholson's Journal, Supplement to Vol. XXXI.]

I. I WAS consulted, in the beginning of the year 1809, upon a disease of vision, which, as far as I know, has not hitherto been mentioned by any author. The subject of it was a gentleman about thirty-five years old, very tall, and inclining to be corpulent. About a month before I saw him, he had been attacked with a catarrh, and, as this was leaving him, he was seized with a slight stupor, and a feeling of weight in his forehead. He began at the same time to see less distinctly than formerly with his right eye, and to lose the power of moving its upper lid. The pupil of the same eye was now also observed to be much dilated. In a few days the left eye became similarly affected with the right, but in a less degree. Such was the account of the case, which I received from the patient himself, and from the surgeon who attended him. The former added, that previously to his present ailment his sight had always been so good, that he had never used glasses of any kind to improve it. On examining his eyes myself, I could not discover in them any other appearance of disease, than that their pupils, the right particularly, were much too large, and that their size was little affected by the quantity of light which passed through them. At first, I thought that their dilatation was occasioned by a defect of sensibility in the retinas; but I was quickly obliged to abandon this opinion, as the patient assured me, that his sensation of light was as strong as it had

ever been during any former period of his life. I next inquired, whether objects at different distances appeared to him equally distinct. He answered, that he saw distant objects accurately, and, in proof, told me what the hour was, by a remote public clock; but he added, that the letters of a book seemed to him so confused, that it was with difficulty he could make out the words which they composed. He was now desired to look at a page of a printed book through spectacles with convex glasses. He did so, and found that he could read it with ease. From these circumstances it was very plain, that this gentleman, at the same time that his pupils had become dilated, and his upper eye-lids paralytic, had acquired the sight of an old man, by losing suddenly the command of the muscles by which the eye is enabled to see near objects distinctly; it being known to those, who are conversant with the facts relating to human vision, that the eye in its relaxed state is fitted for distant objects, and that the seeing of near objects accurately is dependent upon muscular exertion.

The disease of which I have spoken is perhaps not extremely rare. For having related the preceding instance of it to Mr. Ware, a fellow of this society, he was kind enough shortly after to send to me a young woman, who appeared to be likewise affected with it. But as I saw her only once, and had not then sufficient time to examine her case minutely, I speak with diffidence concerning its nature.

II. After I had reflected frequently upon these cases, it occurred to me, that, as the juice of the herb belladonna, when applied to the eye, occasions the pupil to dilate considerably, and to become unalterable by light, an effect might at the same time be produced by it upon vision, similar to that which I have just described. I had, indeed, in the course of a few years immediately preceding, applied belladonna several times to my own eyes, without observing any change in my sight, beyond what I referred to the increased size of the pupils; but as I had not looked for any other, I thought it possible, that some additional one might have happened, without my having perceived it. I resolved therefore to make the experiment anew. But to conduct it with precision, it was previously necessary to know, to what extent I possessed the faculty of adapting my

eyes to different distances. On this subject I had made many experiments with great care, nearly twenty years before, and had ascertained,* that with my left eye, which was more perfect than the right, I could bring to single points on the retina, pencils of rays, which flowed from every distance, greater than that of seven inches from the cornea. In the mean time, however, my eyes had altered considerably, with respect to their seeing near objects distinctly, and I had, in consequence, been obliged, not only to use convex glasses, but to change them several times for others of higher power. No dependence therefore being now to be placed on my former experiments, in regard to the present state of my sight, I repeated them, and found, to my great surprise, that the power I once possessed of adapting my eyes to different distances was entirely gone; in other words, that I was now obliged to regard all objects, whether near or remote, in the same refractive state of those organs. I found also, that my eyes, considered as mere optical instruments, were nearly the same as they had been in my youth, and that the convex glasses which I used did very little more than supply, with respect to near objects, the place of a living power which I had lost, without compensating, except in a very small degree, for any alteration in the external shape of the eye, or any change in the configuration of its interior parts. I ascertained, for instance, that to give my left eye the refractive power which it formerly possessed while in its most relaxed state, that by which it was enabled to bring a pencil of parallel rays to a point on the retina, a glass of thirty-six inches focus was fully sufficient; whereas to produce an equal effect upon rays proceeding from a point at the distance of seven inches from my eye, the other extremity of my ancient range of perfect vision, I was now obliged to employ a glass having a focus of only six inches. I regret much, that I had not made such experiments frequently before, as I think it very probable, that I should have found a period in the progress of my vision to its present state, in which my capacity of seeing distant objects was the same as in my youth, and when there-

* Essay on Single Vision with two eyes, &c. p. 137.

fore the whole of my imperfect vision of near objects would have been owing to a loss of the muscular powers of my eye.

As there can be no good reason for supposing, that the changes which have occurred in my eyes are different from those, which the eyes of by far the greater number of persons, who are not short-sighted, undergo at the approach of old age, it is evident, that the experiments of Dr. Young* on the eye of Hanson, whom the learned author considered as a very fair subject for such trials, furnish no proof, that the want of the crystalline lens disables a person from having perfect vision at different distances; for as Hanson was sixty three years old, it is highly probable that the results of the experiments would have been exactly the same, if he had still possessed that part of his eye.

III. Having discovered, that my own eyes were unfit for the experiments, which I wished to be made with belladonna, I instructed an ingenious young physician, Dr. Cutting, from the island of Barbadoes, and now residing there, in the manner elsewhere described by me,† of ascertaining his range of perfect vision by means of luminous points. This he found, in consequence, to begin, with respect to his left eye, at the distance of six inches, and not to terminate at the distance of eight feet; beyond which he could not see clearly the object, with which he had hitherto made his experiments, the image of the flame of a candle in the bulb of a small thermometer. The flame of a lamp, distant about sixty yards, gave a faint indication of its rays meeting before they fell upon the retina; the rays from a star had very evidently their focus a little before that membrane. He now applied the juice of belladonna to his left eye. Half an hour after, when his pupil was but little dilated, perfect vision commenced at the distance of seven inches; in fifteen minutes more, it began at the distance of three feet and a half. When his pupil had acquired its greatest enlargement, the rays from the image of the flame of a candle, in the bulb of a small thermometer at the distance of eight feet, could not be prevented from converging to a point behind the retina. The rays from lamps still more distant, and from

* Phil. Trans. 1801, p. 66: see Journal 4to series, vol. v.

† Essay on Single Vision, &c. p. 116.

stars, had their focusses at the same time on the retina. This state of vision continued, in its greatest extent, to the following day; and it was not till the ninth day after the application of the belladonna, that he completely recovered the power of adapting his eye to near objects. While his left eye was thus affected, the vision of the right remained unaltered.

Dr. Cutting remarked, while his left eye was returning to its natural condition, that the diminution of the pupil, and the increase of the range of perfect vision, did not keep regular pace with each other; but that, after his pupil had nearly returned to its former size, his capacity of adapting the eye to different distances was still very limited. As these effects therefore are not inseparably connected, they may occur in others in a different manner from that which he observed. A great degree of dilatation, for example, may take place in the pupil, without a total want of the power to adapt the eye to different distances.

Though I could not doubt the accuracy of Dr. Cutting's observations, more especially as the altered state of his eye had lasted a considerable time, and as he had not been prevented by other occupations from attending minutely to the appearances, which were consequent upon it; yet, as he was the first person who had ever applied belladonna to his eye, for the purpose which has been mentioned, and as the results had been remarkable, I requested him to repeat the experiment with his other eye. He complied with my desire, and found, that the appearances which followed were similar to those, which had been produced by the application of belladonna to his left eye.

It will, perhaps, be thought extraordinary, that Dr. Cutting's eye in its relaxed state, before the application of the belladonna, brought parallel rays to a focus anterior to the retina; but that similar rays met in a point upon the retina, while the eye was under the full influence of that substance; as it may hence seem, that the belladonna had done more than merely suspend the exercise of the power, by which the eye is fitted to see near objects distinctly. An observation drawn from the former state of my own sight will, I expect, make this matter plain.

When I enjoyed the faculty of adapting my eyes to objects at different distances, the rays of a star, which was viewed at-

tentively by me, always met in a point a little before the retina;* whence I at first concluded, that my eye was unfit for accurate vision by parallel rays. But I afterward found, that if I looked at a star carelessly, its rays had then their concourse on the retina. In the former case, from long habit, originating in my having chiefly viewed near objects with attention, some small exertion was made for the accurate view of a distant object, though none was resquisite; in the latter, all demand for exertion ceasing, my eye fell into the most relaxed condition, that by which it was fitted for parallel rays. Dr. Cutting's eye seems to have been similar to what my own once was, in regard to such rays; but as he had not acquired the faculty of viewing a distant object, without making some exertion, the rays from a star crossed one another in his eye before they came to the retina. The capacity, however, of making any exertion was taken away by the belladonna, and pencils of parallel rays were, in consequence, brought to points upon that membrane.

IV. Being now in possession of a new instrument, I next attempted to gain, by means of it, some illustration of the changes, which the vision of short-sighted persons undergoes from age.

It has been very generally, if not universally, asserted by systematic writers upon vision, that the short-sighted are rendered by age fitter for seeing distant objects than they were in their youth. But this opinion appears to me unfounded in fact, and to rest altogether upon a false analogy. If those who possess ordinary vision, when young, become, from the flatness of the cornea, or other changes in the mere structure of the eye, long-sighted as they approach to old age, it follows, that the short-sighted must, from similar changes, become better fitted to see distant objects. Such appears to have been their reasoning. But the course pursued by nature seems very different from that which they have assigned to her. For of four short-sighted persons of my acquaintance, the ages of whom are between fifty-four and sixty years, and into the state of whose vision I have inquired particularly, two have not observed that their vision has changed since they were young, and two have

* Essay on Single Vision, &c. p. 138.

lately become, in respect to distant objects, more short-sighted than they were formerly. As the manner, in which this change has occurred, is unnoticed, I believe, by any preceding author, I shall here relate the more remarkable of the two cases.

A gentleman, who is a fellow of this society, became short-sighted in early life; and as his profession obliged him to attend very much to minute visible objects, he for many years wore spectacles with concave glasses almost constantly, by the aid of which he saw as distinctly, and at as great a variety of distances, as those who enjoy the most perfect vision. At the age of fifty, however, he began to observe, that distant objects, though viewed through his glasses, appeared indistinct, and he was hence led to fear, that his eyes were affected with some disease. But happening one day to take up, in an optician's shop, a single concave glass, and to hold it before one of his eyes, while his spectacles were on, he found to his great joy, that he had regained distinct vision of distant objects. With regard to such objects, therefore, he had lately become shorter sighted than he had formerly been. But along with this change, another occurred of a directly opposite kind. For when he wished to examine a minute object attentively, such as he used to see accurately by means of his spectacles, he now found it necessary to lay them aside, and to employ his naked eye. He had become, therefore, in respect to near objects, longer-sighted. The power, consequently, in this gentleman, to adapt the eye to different distances, is either totally lost or much diminished; but the point, or small space to which his perfect vision is now confined, instead of being the most remote to which he could formerly accommodate his eyes, as is commonly the case with the ordinarily sighted when they are becoming old, is now placed *between* the two extremes of his former range of accurate vision. The eyes of the other short-sighted person, a physician of considerable learning, whose vision has been altered by age, have been affected in a similar manner, but not in so great a degree.

As the only change, which had occurred from age in the sight of such of my acquaintance as were considerably myopic, was a lessening, on both sides, of their range of perfect vision, I conceived, that this might be the ordinary procedure of nature in such cases, and that it might be imitated, in a young short-

sighted person, by the application of belladonna to his eyes. I have hitherto not been able to obtain permission to make the experiment on any young person, who is very short-sighted. Two gentlemen, however, who are somewhat short-sighted, have readily submitted to it; one of them, Mr. Blundell, a diligent and ingenious student of medicine; the other, Mr. Patrick, a well educated young surgeon in London. The first experiment was on Mr. Blundell, and the apparent result was, that the range of his accurate vision was considerably diminished at both ends, but not annihilated. Mr. Blundell, however, afterward informed me, that he repeated the experiment with more care in the country, and found, that in one eye, the nearest point of perfect vision was moved forward about two thirds of the whole range, and in the other about one third; but that, with respect to both eyes, the most remote points of the ranges were unchanged. He added, that while one eye was under the influence of the belladonna, the other became shorter-sighted than it had been before; but the difference was not so great, as to induce me to place entire confidence in the justness of his observation. I think it right to mention here, that, from mistake, I applied only two thirds of the ordinary quantity of belladonna to his eye, in the first experiment; and that he probably, in consequence of my example, applied no more when he made the second; as this might have been the reason, that during both experiments he retained, in part, the capacity of adapting his eyes to different distances.

The experiment on Mr. Patrick was conducted by myself, after he had been frequently exercised in observing the extent of his perfect vision. The results were similar to those which had been remarked by Dr. Cutting. The power of altering the adaptation of his eye, according to the distance of the objects viewed, was for some time entirely lost, and his sight became accurately fitted for such only, as were placed at the farther extremity of his former range of perfect vision. While one eye was under the influence of the belladonna, the vision of the other was unaffected.

From these experiments it seems probable, that belladonna will in no case produce the same effect upon a young short-sighted person, that age has produced in the two instances of

which I have spoken. I expect, however, to have an opportunity of repeating the experiment on two persons, who are very considerably short-sighted; and I shall take the liberty of communicating the result to the Royal Society, together with some observations I have already made, and others which I hope to make, respsecting those persons, who seem to retain, to extreme old age, the power of seeing perfectly, as far as the accommodating power of the eye is concerned, both distant and near objects; and of others, who, after being without this power for many years, appear to regain it at a similar period of life. Probably the making known my intention may facilitate its accomplishment, by inducing other Fellows of the Society to furnish me with opportunities of increasing my knowledge of these subjects. In the mean time, I shall offer a few words upon two other topics in vision, which seem to derive illustration from my experiments with belladonna.

V. 1. Not only do the pupils move together, when both eyes are in a healthy state, but the pupils of one eye affected with gutta serena moves with the pupil of the other, as long as this remains sound. These facts are generally, but in my opinion erroneously, attributed to the immediate sympathy between the pupils. For when the pupil of one eye becomes dilated from the application of belladonna, the pupil of the other, so far from dilating, becomes smaller. It follows, therefore, that the size of the pupil is dependent, not only on the impression of light on the retina of its own eye, but on that also which is made on the retina of the other; and that the moving of the two together, which for the most part takes place, is only an accidental consequence of the fact which I have mentioned.

2. As the action of the external muscles of the eye has been frequently resorted to, for an explanation of its capacity to see objects perfectly at different distances, I requested Dr. Cutting to attend to this matter. He accordingly ascertained, while his eye was in its natural state, the distance from his face of the nearest point, at which he could make the two optic axes meet, this being the greatest trial of strength, to which those muscles can be exposed. Shortly after, he repeated the experiments, while, in consequence of the application of belladonna, he was without the power of adapting his eye

to different distances, and found, that the strength of those muscles was not diminished. It follows, therefore, not only that the external muscles have little or no concern in fitting the eye to see distinctly at different distances, but that the same is true with respect to the cornea; as we cannot suppose, that its mechanical properties were altered by the belladonna, or at least, that it became more inflexible from the application to it of the juice of that herb. I had before made a similar experiment on myself, by comparing what had been the strength of the external muscles of my eyes twenty years ago,* with what it was after I had lost the power of altering their refractive state; but though I found no difference, yet, as their coats might have in the mean time become more rigid, I thought it right to have the experiment repeated, in a manner to which no objection could be taken.

The only other part of the eye, or its appendages, which remains for enabling us to see equally well at very different distances, is the crystalline; and that it does produce this effect, either wholly, or very nearly so, is manifest, from the necessity even young persons are under, who have lost it, of using glasses of very different convexities for near and remote objects. But in what way this important office is performed by it seems still unknown. The learned Dr. Young, indeed, as well as others before him, has supposed, that the crystalline has the power of altering its figure; but the proofs hitherto given in favour of this opinion appear very defective. In 1794, I attempted to submit its justness to the test of direct experiments, by applying to the crystallines of oxen, which had been felled from thirty seconds to a minute before, chemical and mechanical stimuli, and those of galvanism and electricity; but in no instance was any alteration of figure, or other indication of muscular power, observed. All of these stimuli were applied to the crystalline while it was surrounded by air, and some of them while it was covered with warm water. Last summer, after I knew that men lose, from increase of years, the faculty of altering the refractive state of the eye, I thought it possible, that the oxen on which I had made the experiments were too

* Essay on Single Vision, &c. p. 138.

old for them. I therefore repeated most of them on the crystallines of a calf and a lamb; but still no motion was to be seen. Dr. Young has made similar experiments with a similar event; but he thinks, that no argument can hence be derived against his opinion, as neither can motion be excited in the uvea, by any artificial stimulus. In the first place, however, it is not agreeable to just reasoning, to regard an unknown thing as an exception to a general rule, rather than as an example of it; in the second, the motions of the uvea are involuntary, whereas the adaptation of the eye is, in part at least, under the command of the will; and in the third, the crystalline seems very unfit for performing the motions which he assigns to it; for if its figure be altered out of the body, by external force, it does not restore itself, but retains the shape which has been given to it, like a piece of dough, or soft clay. Possibly farther experiments with belladonna may contribute to remove the obscurity which at present surrounds this subject.

Transactions of the Physical Department of the Imperial Institute during the year 1811.

ANATOMY, PHYSIOLOGY, AND ZOOLOGY.

[From the London Medical and Physical Journal, for May, 1812.]

In the account of the proceedings of the Institute last year, in noticing the researches upon the action of the nerves of the eighth pair in respiration, allusion was made to the important experiments by which M. Legallois, physician at Paris, has proved that very young animals may live without respiring for a certain time, the duration of which is proportionate to their nearness to the period of birth; in other words, that the younger the animal is, the longer it is capable of living without breathing.

M. Legallois, having subjected very young animals to other lesions, has obtained results yet more singular, and has been enabled to resolve a question disputed by anatomists nearly two centuries; viz. the influence which the nerves have in the motions of the heart.

Having decapitated some of these animals, he observed that their heads continued to give signs of life, precisely the same time for each age that the animals of that age could pass without respiring; from which he concluded, that the heads died only from want of respiration.

It is further determined by the experiments of Fontana, that it is possible to prolong life in the decollated trunk by inflating the lungs. The immediate principle of the life of the trunk is then in the trunk itself.

But, on the other hand, it is known that the life of each part requires its direct communication with the spinal marrow by means of the nerves, and a free circulation of blood in the portion of medulla oblongata which supplies nerves to that part.

This being admitted, we should suppose that the simple destruction of a portion of spinal marrow ought only to affect those parts to which it gives nerves; but it happened otherwise in the experiments of M. Legallois. The destruction of a portion of spinal marrow quickly killed the whole body, and consequently produced greater effect than decollation itself.

Upon attentively examining all the circumstances of this phenomenon, M. Legallois perceived that this lesion weakened and soon altogether stopped the circulation; the arteries emptied themselves. He therefore concluded, that in such cases death was produced by the motions of the heart being enfeebled.

This conjecture was verified by experiments. In diminishing, either by means of ligature on the arteries, or even by amputation, the number of parts to which the heart should supply blood, the power which remains in it is sufficient, because it has less efforts to make, and the lesion of the medulla is less quickly mortal. Thus an animal whose head is cut off, will die slower from a lesion of the spinal marrow, than if its head had remained on; and, as a partial lesion of the medulla, after some time, considerably diminishes the circulation in the parts to which the portion of marrow destroyed gives nerves, the destruction of a portion of medulla gives the means of destroying, after a little time, another portion without causing death so speedily. Thus, when we have decapitated an animal, it is more easy to destroy its cervical marrow without

killing the rest of its trunk; and, when we have destroyed its cervical marrow, it is easier to perform the same operation on the dorsal marrow; so that if we could supply them with the heart and lungs, we might make each of these amputated portions of the body live successively, without the others; and the chest which contains these organs can preserve its life a considerable time without the assistance of any of the other parts.

The general and direct result of these curious experiments is, that the motion of the heart depends entirely upon the spinal marrow which exercises its influence upon it, by means of the grand sympathetic. In this manner we can explain why the heart is affected by passions without immediately depending on the brain, and we are thus enabled to submit to the empire of the nerves the only muscular organ on which nervous influence was liable to some objections; in short, as the suppression of the brain does not immediately affect the motions of the heart, whilst that of the spinal marrow destroys them, the opinion advanced within some years by great physiologists, that the brain is not the only source of nervous action, but that each part of the nervous system also exercises a share in that action, is fully confirmed.

The count de Cessac, minister of war, and member of the class of the French language and literature, having consulted the class of sciences upon the means of preventing the ravages which certain worms make in the magazines of cloths and woollens, Messrs. de Lamarck, Vauquelin, Richard, and Bosc, have made a full report upon this important object.

These worms are the caterpillars of six or seven species of small night moths, which not only devour the hairs of animals, but also make of them small tubes, which serve them for clothing as well as a habitation. Many chemical agents will destroy these caterpillars, but most of them, if incautiously used, would do more mischief to the cloths than the insects themselves. However, heat may always be had recourse to, and in all cases it is well to prevent the multiplication of the caterpillars by destroying the moths, and using every means for preventing them getting into the magazines. The limits of this report

do not admit of our detailing the particulars recommended by the commissaries for accomplishing these different ends.

Natural philosophers have long sought for the causes of the phosphorescent appearance which the sea frequently exhibits. The late M. Peron published, some months before his death, a very complete work upon this curious phenomenon, in which he indicated a greater number of animals that contributed to it, and which often vary in themselves, according to the climate in which the phenomenon manifests itself.

M. Suriroy, physician at Havre, excited by M. Peron, has examined the luminous animals of the port he inhabits, and has described one species globulous, about the size of a pin's head, and so numerous that it sometimes forms a thick crust on the surface of the water. Besides its spontaneous phosphorescence, it shines when it is irritated, and even when bruised.

M. Lamouroux, professor at Caen, has carefully examined certain small fish, known in Normandy by the name of *montée*, from their going in prodigious numbers up the rivers d'Orne, de Touque, and de Dive. They are commonly supposed to be the young of eels, but M. Lamouroux has found that they bear more resemblance to the conger, without, however, possessing all its characters; it is probable that they are the fry of a particular species, for it has been ascertained that several species of eels exist at the mouths of our rivers (in Normandy) not yet accurately described by naturalists.

Medicine and Surgery.

M. Chaussier, correspondent and professor in the faculty of medicine, has communicated a memoir upon that complaint so dangerous to lying-in women, known by the term *puerperal fever*, or *peritonitis*.

Physicians have long attributed it to a milky effusion, because they found, in the abdomen of persons who died of it, a serous fluid mixed with flakes resembling a caseous substance; but M. Chaussier has shown that these substances have nothing in common with milk, except a false resemblance. He quotes instances of a similar disease attacking men and young girls; proves that it is of a catarrhal nature; explains, from the changes of constitution during pregnancy and parturition,

why women in childbed are more exposed to it than other individuals; and, what is yet more important, declares, that in many cases he has obtained the most marked success in puerperal fever, by the employment of vapour baths, and friction of mercurial ointments on the abdomen.

M. Itard, physician to the school of the deaf and dumb, has succeeded in restoring a case by perforating the tympanum, as practised in this country, by Mr. A. P. Cooper.

Amongst the numerous operations to which the military surgeon is compelled by the casualties so frequent in battle, few are so hazardous, and so seldom attended with success, as amputation of the arm at the shoulder joint; and, of the many accidents that occur to interrupt the hope of the surgeon, none is more cruel than tetanus, or that convulsive rigidity which, in certain circumstances, seizes on the wounded, and hurries them to a death the more dreadful, because their intellectual faculties are not affected. M. le baron Larrey, whose experience in military surgery is proportioned to the murderous wars which have contributed to it, and to the various and remote theatres where he has been successively transported with the French armies, has presented to the class memoirs upon both these subjects. In the first he relates fourteen successful cases of amputation at the shoulder joint. In the second he states the almost miraculous effects which he has obtained from caustic (*du feu*) in tetanus, by applying it to those parts where he judged the centre of nervous irritation might be situated. Cold affusion, recommended by the English and German physicians, on the contrary, never afforded him any satisfactory results.

Another disease, which too frequently unites its ravages with those of war, is that kind of putrid fever which arises in places where men are crowded together in too great numbers, and which has been termed hospital, ship and jail fever. M. Masuyer, professor at Strasbourg, has addressed to the class a memoir, in which he affirms that acetite of ammonia, or sp. mindereri, given in large doses, has produced the most marked effects, and considerably diminished the mortality in those hospitals in which the fever prevailed. Those at Paris are now so well regulated, that happily no opportunity of verifying

the assertion of M. Masuyer has occurred; but the remedy has been tried in common putrid or adynamic fevers, and has been found to prevent the formation of the black crust or fur which covers the tongue and gums in such cases.

Among the medical works published this year by the class or its correspondents, we have chiefly to notice the treatise of M. Portal on the Nature and Treatment of Apoplexy; the second edition of the treatise on Organic Diseases of the Heart, by M. le baron Corvisart; the Medical Discourses, Memoirs, and Observations, of the late M. Desessarts; the great treatise on Hernia, by M. Scarpa, professor at Pavia; and the Manual of Practical Medicine, by M. Odier, professor at Geneva.

Veterinary Art and Agriculture.

It has long been known that the disease called *tourni* is caused by an animal in the class of intestinal worms, which exists in the brain of the sheep, and compresses or destroys that organ. Another disease in the same quadruped is occasioned by a worm called *douve*, which propagates in the biliary vessels of the liver; in short, some physicians suppose that the itch is owing to a small insect which is occasionally observed in the pustules produced in that complaint. M. Morel de Vindé, correspondent of the class, having remarked that a phthisis, which appeared on the suppression of an itch, had yielded to the internal use of sulphur, concluded that, being cured by the same means as the itch, it ought to depend on the same cause, that is, on the same parasitic animals which might have penetrated interiorly. He has extended this conjecture to several other diseases, and particularly to that named *pesoyne*, *pietain*, or *mal blanc*, which is an ulcer in the foot of the sheep. This malady, which, if neglected, quickly rots the foot and even the leg, and invariably destroys the animal, and for which no remedy has been found but the strongest caustics, has constantly been cured by a simple means devised by M. de Vindé, in consequence of the hypothesis which he had formed. His remedy consists in paring the horn of the foot till the white spot which the ulcer forms is seen, and slightly rubbing the horn

with a bunch of feathers dipped in aqua fortis. Some hours afterwards the sheep ceases to limp, and it is seldom necessary to repeat this simple operation. M. de Vindé has performed the experiment on more than fifty sheep without its ever failing, or making them feverish and lose their milk, as frequently happens when other means have been pursued.

M. d'Audebert is engaged in a great work upon the relations which the diseases of animals have to those of man. M. Noyez, veterinarian at Mirepoix, addressed a memoir to the class upon the good effects which result from the shearing of domestic animals, such as the ox and the horse, both in the cure and prevention of certain diseases.

SELECTED REVIEWS.

A Dissertation on the Bite of a Rabid Animal; being the Substance of an Essay which received a Prize from the Royal College of Surgeons in London, in the year 1811; *by* JAMES GILLMAN, F. L. S. Member of the Royal College of Surgeons in London, 8vo. pp. 181. Callow. London. 1812.

[From the London Medical and Physical Journal, for March, 1812.]

THE universal fatality, the obscurity, if not the uncertainty, of the pathognomonic signs, especially as they arise in the dog; the discrepancies of opinion respecting the *modus operandi* of the poisonous or infecting material; and the little light that examinations *post mortem* have afforded, combine to render RABIES CANINA a subject of great and important interest to the medical inquirer. As a question for philosophical discussion, as an illustration of the laws of life, and of the properties and principles of the mysterious power which impels and directs the movements and functions of organized beings, this disease also presents incitements of high consideration. Such inquiries have a legitimate claim, not only on philosophy and science, but on all branches and orders of society. Every disease over which medicine has failed to manifest a remedial power, has appropriate to it, the cunning assert, and the credulous believe, some never-failing nostrum: *Rabies Canina* has its thousand specifics. Memory sickens at the destruction which has followed the employment of these *specifics*. And it is on this point that we view Mr. Gillman's Dissertation as a public good. It establishes the fact, that no remedy has been yet discovered for the disease produced by the rabid poison acting on the system; and most forcibly shows, that the only means which can be employed, with any chance for success, are those which remove the poisonous fluid from the part to which it is applied.

In treating this important subject, the author of this Dissertation distributes his materials into three sections, in which he examines the "Characteristics of Rabies in a Dog;" the "Treatment of the Bite of a Rabid Animal;" and the "Consequences of that Bite."

In the first section we are presented with many curious and interesting details on the distinguishing marks constituting the character of rabies in the dog; a subject hitherto not sufficiently investigated, embarrassed with erroneous statements, false opinions, and hasty conclusions. That multitude of dogs have been denounced as laboring under this disease when it did not exist, and prematurely destroyed in consequence, no doubt can remain. That serious, though false, alarms have arisen from this mistake, is equally certain; and that persons bitten by dogs thus circumstanced, or having only had their saliva applied to the unabraded cuticle, have severely suffered from nervous affections induced by disturbed imagination, and imitating closely the specific disease, cannot, we think, be denied. A more important fact even than this, however, is connected with our ignorance of the pathognomonic signs of rabies as it appears in the dog. We shall find, as we follow Mr. Gillman in his inquiry, that one symptom which has generally and popularly been considered as marking this disease, does not invariably or commonly exist; and that a dog is actually suffering from rabies without being suspected, from the absence of a symptom which has given one synonym to the complaint.

To understand the history of this dreadful malady with a precision that may be particularly useful, it is essential to trace it from its source downward, and to begin the investigation with the genus of animals where it originates. Though rabies has appeared in one individual of another genus of the class *mammalia*, it seems consonant with propriety to confine the investigation to the genus *canis;* and to show distinctly the progress of symptoms in the dog. And, that we may not deviate from the graphic quality of a picture evidently drawn from the observation of nature, we shall give the detail in the words of the author, who, though he acknowledges the difficulty of giving a correct idea of the first symptoms that take place in this formidable malady, states the following phenomena, descriptive, as far as they go, of the progress of a case of rabies in the dog, to have fallen under his own notice.

"The animal always shows some marked deviation from his accustomed habits; a symptom which ought to be particularly regarded, and is most frequently not only a leading fea-

ture, but often an infallible proof, of approaching rabies. In the more domesticated animals, as lap-dogs, some strange peculiarities have been observed; as the picking up of different little objects, such as paper, thread, straw, &c. or any thing which may happen to be presented to their notice. They have sometimes been observed to eat their own excrements and lap their own urine: these last, perhaps, are the strongest proofs of rabies, and should place us very much upon our guard, as this depraved appetite seems peculiarly to mark this complaint. Still, however, in this stage of the disease, they seldom attack any one unless provoked to it.

" It must be observed, that though a dog's temper remains meek, and frequently continues so during the whole of the disease, yet he is easily alarmed. He often observes the same obedience to his master, and shows the same degree of attachment, but still he is extremely irritable, and always treacherous, suffering any one to fondle him, and then suddenly snaps or bites with almost the least apparent provocation. As the disease advances, his eyes sometimes become inflamed, and a purulent discharge issues from the lids. The *pharynx* in some cases has been known to become so much inflamed as to render him incapable of barking. This symptom, by sportsmen, has been particularly regarded, and by them termed dumb madness. When deprived of this power, he makes a dismal howl, which is so well known, that when once heard it cannot be mistaken; nevertheless this is not an universal symptom. The incipient stage of this disease has been marked by many writers with the loss of appetite, indifference, listlessness, and melancholy, which have been considered as strongly indicative of rabies; but they are symptoms that cannot be relied on, and attend many other diseases to which dogs are liable. Neither have they the least dread of fluids, and frequently eat with a voracious appetite.* I have had several patients under my care

* This is a fact of much importance, as it points out the dangerous policy of considering *hydrophobia* as a leading characteristic symptom of rabies. Mr. Gillman's observation is corroborated by other practitioners. Dr. Clarke, of Nottingham, relates a case, which occurred in that neighbourhood, of a dog that was not suspected to labor under rabies until ten days after he had bitten an unfortunate person, *who in six weeks after the bite died of hydrophobia.* This

who were bitten by dogs decidedly rabid, and which both ate and drank a few minutes before and after they had committed the act;—consequently such statements should not be relied on.

"As the disease advances, the animal becomes extremely anxious and impatient, and has an inordinate desire to gnaw every thing around him. He is now seized with a more than usual antipathy to cats, which he bites, if within his reach. When chained or confined, he makes the greatest efforts to break loose; and, if he succeeds, he wanders about seeking other animals to bite, but more particularly some of his own species. From a bite in this particular stage of the disease, the consequences are most to be dreaded, and the greatest care should be taken to avoid him. It has been a generally received opinion, that he never moves out of his road to bite any one; but this apparent indifference never takes place till he is exhausted by the disease, or rather till he becomes incapable of the effort; for even now, while he is most active, he is seeking industriously different objects to bite, to which his attention appears solely directed. It has been before remarked that he does not avoid water, and frequently laps it greedily: still in this stage of the disease he is often without the power of swallowing it. Another and not an unfrequent attendant of rabies, is inflammation of the bowels, which may be considered as having taken place when the animal is observed sitting on his rump in apparently great pain: very often he has the appearance of being paralytic behind.

"In the last stage of this disease all the preceding spmptoms are aggravated: he now becomes extremely feeble; his jaw drops as if paralized, and the saliva runs from his mouth; he wanders or rather staggers about with scarcely the power of biting; and, exhausted by the disease, dies generally on the fourth or fifth day from its commencement."

We have here a relation of the progress of this malady,

dog *ate* and *drank* heartily, showed no signs of indisposition, hunted as usual, and occasionally went into a neighbour's house among children without injuring any of them; but on the morning of the tenth day (that is ten days after communicating the disease by the bite, and when he had no hydrophobia) he was observed snapping at every dog in the street, and was, in consequence, destroyed. Vide also Hunter's case of Master Rowley.

comprehending many striking circumstances, as they were presented to our author; but we doubt if observation of the symptoms as they arise, of their degree of intensity in the different stages of the complaint's progress, of their giving way to or becoming mixed with others as the disease advances, has been applied with sufficient correctness; or if experience has yet been enough extended and matured to furnish materials for a history of *Rabies*, discriminated and characteristic; distinguishing it from all other diseases, and especially some others of the class *Neuroses*, so delusively imitative, as frequently, we are persuaded, to have been mistaken for, and then furnishing cured cases of the (supposed) specific disease.* That this is yet the state of our knowledge, Mr. Gillman admits, when he remarks that the " symptoms which accompany this disorder have such variable aspects, and are so diversified, that he is afraid, upon attentive examination, there are few which can be considered essential, or which belong to it exclusively; and the greater part are, perhaps, secondary symptoms only, such as are common to other diseases, or casual and of uncertain occurrence; some arising out of previous symptoms, others the effect of adventitious circumstances."

Are we then to understand that Nature has neglected to place her essential stamp, her unobliterable hand-writing on this malady? Not so:—the physician is not yet enough learned in her phenomena, and covers his want of discernment with the opinion that she is here irregular, uncertain, adventitious, and indiscriminating. Let us pursue the path in which Mr. Gillman has ably started: apply our investigation to the original source—the *dog*, and, perhaps, the desired developement is not far distant. That we may aid the *dénouement*, we shall present to our readers a specimen of the investigation we

* While hydrophobia shall be admitted as the pathognomonic mark of rabies, this mistake will happen. We could refer to numerous cases of spontaneous hydrophobia in confirmation of this, but we confine our reference, at present, to one printed in this Journal (vol. xxii. page 113), strongly marked, and terminating fatally on the third day. In this instance, all the symptoms had uch a degree of intensity, the hydrophobia was so unequivocal, and the fatal termination so speedy, that without the most positive evidence to the c ontrary, it would become an established case of genuine rabies.

mean, as shown in the following clearly written case, containing the history and progress of rabies in a dog, verified by the effect of his bite upon other animals; and the dissection of the dog, with that of the creatures his bite had destroyed.

"June 22d, 1811. A yard-dog belonging to a gentleman in Highgate killed yesterday one of his fowls, which he carried into his kennel. His master, when he saw it, put his hand into the kennel, took it out, and at the same time beat him: he made no attempt to bite him. The dog was not observed to be out of health, and, as was the usual practice at night, was unchained, and suffered to run about the stable yard, in which his kennel stood: on the following morning he was found in the pig-sty worrying an old sow and her two store pigs about ten weeks old, which he had bitten much, particularly about the ears. A suspicion now arose that the animal was rabid, and he was ordered by his master to be shot. Being informed of the circumstance by a friend, I immediately went to see him. I found the dog without the least inclination to be violent or to bite; on the contrary, he was shy, and appeared to be apprehensive of a second beating. This passiveness was observed, however, not to be his natural character; for when in health, if strangers entered the yard, he barked and was extremely violent: this variation from his usual habit placed me on my guard. There was, however, evidently much debility about him: he was thin, and had from one eye a slight purulent discharge; he lapped milk freely, and took animal food. I requested, however, to see the termination of the disease, which was granted; and therefore it was allowed to take its course. In the evening he took his food as usual; and it was remarked by the person who fed him that he had not differed since the morning, nor could we perceive that he was ill. The next morning he was more enfeebled, and began to refuse his food; in every other respect he appeared as yesterday: the third morning he was still more enfeebled, and paralytic in his hind legs; he also refused his food. He attempted once, during the day, to walk the length of his chain, which he could scarcely accomplish; and with the utmost difficulty he crawled back to his kennel. In this state of extreme debility and passiveness he laid the next day. On the fourth morning the gardener saw him so early as four in

the morning, at which time he could scarcely discern his breathing; at breakfast-time he found him dead.

"The following were the appearances on dissection. The pia mater was slightly inflamed; the under surface of the epiglottis was also inflamed; the trachea and œsophagus exhibited no morbid appearances; the stomach contained a chocolate-colored gelatinous-like fluid; the villous coat was very generally inflamed, and several of the rugæ were lived, and of a chocolate colour; there were a great number of mortified spots, some having the appearance of flattened black currants; some more raised like pustules; and in some parts the villous coat was ulcerated and destroyed. No other parts exhibited any morbid appearance. The stomach of this animal presented such determined marks of this disease, that I have subjoined a plate to endeavour to illustrate these appearances. As I wished to prove, if possible, whether the fluid contained in these apparent pustules had the power of infecting other animals, I inoculated two rabbits with it in several places, but without producing the disease or affecting the health of the animal, apparently, in the slightest degree.

"One of the young pigs, already referred to, which had been bitten least, and that only about the ears, on the morning of the tenth day after the bite, refused his food. When offered to him as usual, by placing it in his trough, after smelling at it, he ran back, pointed his nose in the air, and was much agitated: in the evening he had a convulsive motion, and twitching of his limbs. The eleventh day, (the second of the attack) he became extremely violent: when I saw him there was a considerable quantity of frothy saliva about his mouth: he started, and threw himself about in an extraordinary manner; sometimes he sprang at least three feet from the ground; then beat himself forcibly against the wall; and sometimes ran round on his hind legs, as dogs do when playing with their tails. This he continued till exhausted; he would fall down and pant; but soon again became convulsed, and leaped from the ground as before, falling with considerable violence on his back or sides. About noon, the person who fed him gave him a slight blow on the head, and killed him. On dissection the only parts inflamed were, the under surface of the epiglottis, and the villous coat

of the anterior surface of the stomach to the extent of the palm of the hand. The head had suffered such injury from the violence of the convulsions, that no dissection could be made: the skull and lower jaw were fractured: tongue in its natural state.

"The other pig was seized on the noon of the fourteenth day after the bite. This animal was considerably torn by the teeth of the dog, and had a deep wound on the back between the shoulders. He was first seized with rigors, and stood shivering beside his trough, rubbing the bitten parts, which I had observed him to do also the day previous. He refused his food, and appeared debilitated, moving himself languidly and feebly. On the second day of his illness, he became paralysed in his hinder legs; and, after crawling, which he did in the morning, from his sty, in a few hours he was so much worse as to be unable to return. He lay on his side frothing at his mouth, rubbing his nose on the ground, and pulling the straw about and breaking it with his fore-feet and teeth the whole day; he made frequent attempts to swallow some of the bits of straw, in which he very seldom succeeded. The eye-lids were much separated, which gave a staring appearance; the conjunctive membrane was much inflamed. When the old sow went near, it made the same familiar noise or grunt; it did not appear to have the least inclination to bite any thing; I tried it repeatedly by putting a piece of stick into its mouth. The pupils of its eyes were, I thought, dilated, but it could see very well, and was alarmed at the motion of a stick when within two yards of it. On the third day, the seventeenth from the bite, it lay the whole time on its side; and, except occasionally slight twitchings in the legs, it remained perfectly still and unable to rise, having lost all power in its extremities; it squeaked when touched, as if the skin was more than usually sensible, and particularly when the mother went near it or touched it. Towards the evening the breathing became so feeble as scarcely to be discerned, and the conjunctive membrane so turgid as to protrude beyond the palpebræ. It died late at night, seventeen days from the bite.

"*Appearances on dissection.*—On examining the brain there was considerable effusion of blood from the veins of the pia mater, contiguous to the superior longitudinal sinus; there was also much inflammation of the pia mater itself; no morbid ap-

pearances to be seen on the tongue; the under surface of the epiglottis was inflamed, as in the preceding case; in the œsophagus there was no disease; the inner membrane of the posterior surface of the trachea was very slightly inflamed; the villous coat of the anterior surface of the stomach towards the cardia was also very slightly inflamed; and the surfaces of two of the rugæ on the opposite side of the stomach presented a livid appearance, one more inclining to a chocolate color, approaching to mortification; the bladder was very much distended with urine, containing more than a pint. The tunica conjunctiva was turgid, and protruded beyond the palpebræ.

"From this last pig two rabbits were inoculated with the saliva, but without producing any effect. Twenty-seven days after the bite I observed the old sow taking up in her mouth the dirty straw and filth that lay about the sty, which immediately gave rise to a suspicion that this peculiar disease was approaching. The following morning (twenty-eighth day) she refused her food, was perfectly quiet and harmless, came from her bed when called, and was seen to rub, very often in the day, the wounded parts upon her ears. In the evening having some ripe gooseberries in my hand, I went into the sty, (as I was willing to tempt her to eat, for since the morning she had not taken any food,) and offered her them: she ate a few, about half a dozen, and picked up by my feet several skins or husks which I had thrown down; she had, however, much difficulty in swallowing these small bodies.

"The next morning (third day of the attack) she appeared nearly the same as the preceding evening; she was dull, but had no paralysis in her extremities, and came out of the sty when called. There was some inflammation about the parts which had been wounded by the dog's teeth, and more so about those on the ears. I went again into the sty and offered her some milk; she made several attempts to drink, but could not; there was a peculiar convulsive motion of the head and twitching of the under jaw, but no dread of fluids, as she took up with her teeth, apparently observing much caution, some small pieces of cabbage-leaf which swam on the top of the wash; but after moving them two or three times between her teeth she suddenly dropped them, unable to chew or swallow them; she

walked steadily, but moved herself very slowly; the eyes had the natural appearance. By the evening this disorder had made much progress: the convulsive twitchings of the head were much increased, and she was extremely restless; for when this peculiar motion of the head from side to side had ceased, she was busily employed in grubbing up the earth with her nose, as if in search of food. When the spasmodic motion returned, (which it did once in a quarter of an hour or twenty minutes,) she squalled out and became alarmed when any one approached her. On the fourth morning all the preceding symptoms were increased, and every hour the paroxysms returned oftener and were more violent. She frequently jumped up suddenly on her hind legs, and threw herself upon her back with considerable violence: she was affected by the least noise; when I stamped with my foot firmly on the ground, she was thrown by the noise into the most violent convulsive state, and squalled horribly. To such a high degree, in short, did the morbid excitability of the nervous system arrive, that the poor animal was affected by the least touch, which seemed to be torture. In the evening the symptoms were still more aggravated: she beat herself against the walls, and sprang up against the roof of the sty. These attacks continued, and were repeated about once in every ten minutes, till about two o'clock in the morning, when I ceased to hear them, and when I arose I found her dead.

"*Appearances on dissection.*—Some slight marks of inflammation about the epiglottis: the villous coat of the stomach was inflamed towards the pylorus, and had several chocolate colored striated marks approaching to mortification."

This account, drawn faithfully, as it appears, from nature, gives the history of rabies in some of its most interesting points. On the sometimes controverted fact of rabies arising spontaneously, it seems decisive. A dog, chained in a yard, without intercourse with animals capable of inoculating upon him this disease, has it in its genuine form, verified by the effect produced by his saliva. This animal seems never to have been affected with the intense spasms and irritability commonly accompanying rabies; nor with a disposition to do mischief, except on the second night, when he worried the pigs: on the contrary, under the influence of the disease, he became more passive than was

natural to him. He was never hydrophobic, but died on the fourth morning from the attack; and on examination of the body, the stomach was found to exhibit morbid changes, greater than had before been seen to result from the action of this poison. The bitten pigs, although belonging to a genus in which rabies is not known spontaneously to arise, were much more violently affected, particularly the sow, with spasm and convulsions, but they had not hydrophobia. In them the disease rapidly reached its termination; but the marked character seen in the stomach of the dog was wanting. From these cases we should be led to the conclusion, that sometimes death is occasioned in rabies by visible mischief done to some vital organ; at other times by an affection of the brain and nerves, exhibiting on dissection no organic lesion or apparent morbid alteration. In one class the symptoms will be languor, debility, passiveness, paralysis, death; the dissection will show inflammation and sphacelus. In the other, languor, spasm, irritability, intense morbid sensibility, death: if the dissection shows appearance of disease, it is of a minor kind, and esteemed inadequate to the production of such symptoms, or of occasioning death. We are ready to allow that this generalization may be premature, and we venture it only as a hint. But we can understand that gangrene in the stomach may occasion death, and anticipate the frightful spasms we have seen occur in rabies; and we can without difficulty comprehend that when death results from convulsions, and has not the intervention of mortification, that every symptom will be more vehement. This, however, we must not consider as indicating any particular modification in the essence of the disease: it may depend on adventitious circumstances separate, or combined with idiosyncracy. The great advantage of remarking these facts is, that they prove rabies to exist independent of hydrophobia and convulsion. We have before shown, by a case cited from our Journal,* that hydrophobia, in its most violent form, does also arise independent of the rabid poison. To correct the false idea of hydrophobia being an essential or pathognomonic symptom of rabies, we have dwelled with some solicitude on this part of

* Vide Note, page 185.

Mr. Gillman's Dissertation, and would impress our readers with the propriety of rejecting an opinion founded on loose and popular tradition rather than on an observance of nature. Without the verification of the disease being propagated by the *saliva* of the dog, in the case related by Mr. Gillman, it would, perhaps, be denied that he was destroyed by *rabies*. It is plain, therefore, that we have yet to learn the generic marks of this disease.

There are other facts connected with this detail, of no small importance, and which would have been lost to science but for the vigilance of our author. The varying periods at which the disease appears after the inoculation, is distinctly marked in these instances. In one pig the disease appeared on the 10th day after the bite; in the other on the 14th; and the sow was attacked on the 27th day. In two of these cases there was evident increasing irritation in the bitten part: it was seen in the pig to precede the symptoms twenty-four hours, and also in the sow, probably, though unobserved until the general affection had appeared.*

It is known with great certainty, that the specific poison of rabies exists in the *saliva;* but it has been a question how far the solids and fluids have been generally contaminated. This history furnishes some facts which go far to prove that the infecting material of rabies is hardly to be found but in the

* The time at which the disease appears in various individuals after the infliction of the bite, is known to be indeterminate. It is desirable to ascertain the shortest and the longest period at which rabies has occurred after the insertion of the poison. We insert the following history to assist in determining this question. On the 8th of June, 1791, the man who slept in the kennel, and had the care, of Earl Fitzwilliam's hounds, was in the night unusually disturbed by the hounds fighting. He got up several times to quiet them, but always found the same hound quarrelling. He was induced in consequence to notice him; and, finding him stupid and quarrelsome, he confined him by himself: the hounds were quiet for the remainder of the night. At the end of the third day he became rabid, and on the fifth died. Preparations were made for confining the forty-two couple of hounds separately. The symptoms and progress of the disease were exactly minuted by a medical gentleman. Six of the hounds became rabid in the following order:—the first on July the 1st; the second on August the 3d; the third on September the 3d; the fourth on September the 4th; the fifth on November the 10th, the sixth on December the 8th.—*Daniel's Rural Sports.*

saliva; and certainly a morbid fluid is no more to be detected in the other fluids of the body, than is the natural venom of the viper or *crotalus horridus*.

"As I wished (says Mr. Gillman) to prove, if possible, whether the fluid contained in these apparent pustules (on the villous coat of the stomach of the dog whose case has just been related) had the power of infecting other animals, I inoculated two rabbits with it in several places, but without producing the disease or affecting the health of the animal apparently in the slightest degree."

The sow and two pigs which were bitten by this dog, and died rabid, were dissected by Mr. Brooks the anatomist; and we observed, that, when employed in this process, his fingers had several slight wounds upon them: but no inconvenience occurred. The flesh of these rabid animals was also perfectly harmless: it was eaten by dogs, foxes, eagles, and hawks, with impunity. A rabid dog was examined after death by Mr. Bayford, of Parson's Green. While inspecting the fauces of this dog, Mr. Bayford cut his finger, but without subsequent disease. The apprehension, therefore, that considerable danger is incurred by anatomists in the dissection of rabid animals, seems unfounded.

The remaining part of this section treats of the remote or primary cause of rabies, and of its spontaneous origin: but, as the author's reasoning turns upon facts selected from printed documents, already in the hands of medical readers, we shall pass it over with observing that the occasional causes from which this disease is said to arise are climate—putrid aliment—deficiency of water—want of perspiration—and worms under the tongue; and shall conclude, thus far, with citing the subsequent corollaries.

"1st. That wildness, fury, madness, &c. which the term *rabid* implies, does not form an essential character of the disease.

"2d. That the dread of fluids, in consequence of which, by some writers, this disease has been termed *hydrophobia*, is not an essential symptom, nor is the loss of appetite; but, on the contrary, dogs eagerly lap fluids, although in some period of

the disease they are deprived of the power of swallowing them; and they will frequently as freely eat.

"3d. That appearances of inflammation, particularly of the stomach, are not always found after death; and that the bodies of these animals occasionally exhibit no mark of disease whatever.

"4th. That, although the preceding symptoms may be absent, as fierceness, loss of appetite, and dread of water, and though there should be no mark of disease after death, &c. the dog is capable of communicating this disease to various animals, particularly to the human species.

"5th. That climate, putrid aliment, want of water, deficiency of perspiration, &c. are, from the best authorities, not the cause of rabies.

"6th. That there is not evidence sufficient to disprove that this disease arises spontaneously in dogs, but that neglect of cleanliness and confinement may be considered as highly contributing to the production of this dreadful malady.

"7th. That the proposals for quarantine, but for a much longer period, are deserving of consideration, and may tend at least to develope some important points.

"8th. That all persons should avoid familiarity with strange dogs, and never trust or fondle any dog when he has deviated from his general appearances or habits, or is out of health.

"9th. When a person is bitten, the dog should be confined for ten days, and not killed immediately, as is too often practised, in order that a correct opinion may be formed of the case."

In the second section, "*On the Treatment of the Bite of a Rabid Animal*," the author goes into a question of the deepest importance. In rabies, when once manifested in the system, all human skill, all power of medicine, has failed: to prevent the accession of, rather than study for a remedy for, the disease now actually existing, should then be the point to which all our views ought to be directed. It is matter of curious speculation, rather than of practical utility; proper to agitate the reasoning pathologist, more than to influence the plain therapeutist, whether the rabid "virus is mixed with the blood through the medium of the lymphatics, which absorb the poi-

sonous saliva, and thus in a secondary manner, acting on the nerves, producing this fatal disorder: or that the infection acts locally, and by irritation, not only on the nerves, but tendons also, sympathetically affects the whole nervous system, without the introduction of the poison into the circulation." Whichever of these be the fact, the effect is the same, always resisting medcine, always terminating in death. To prevent this absorption, or this irritation without absorption, by removing the deleterious body, is, therefore, the great and only object.

To effect this, various means have been suggested. Scarification, suction, caustic, ablution, and excision, are those which most deserve attention; and of these our author inquires into the *modus operandi* and comparative efficacy of three—caustic, ablution, and excision.

To the employment of caustic he objects, both theoretically and practically. The frequent accession of rabies after the application of these substances to the wound, is doubtless a forcible argument against trusting to them; and many cases are cited to establish this fact. But whether the reasoning intended to explain this result be satisfactory, we shall submit to our readers; doing the author, however, the justice of allowing him to state his own conclusions. After a short inquiry into the chemical composition of the saliva, and the structure of the muscular fibre, the affinities to which they are liable, and the decomposition they are subjected to, he observes,

"Whenever alkalies, as pure potash, or pure potash and lime, are inserted into a wound containing the poisonous saliva, and there, as is generally practised, rubbed about for some little time, the alkali first unites with the morbid saliva, next with the more muscular or solid parts, &c. of the wound, till the whole of the surrounding parts, as far as its action extends, are intimately blended. A new compound is in consequence formed, a saponaceous mass, or eschar, which is generally supposed to remain until it sloughs away. Of what then is this new compound formed, but of dead animal matter, a caustic, and the peculiar poison which we believe to be the cause of hydrophobia (*rabies*,) and which it ought to be our immediate care to remove? It is true the neighbouring absorbents are destroyed as far as the action of the caustic extends; but the canine virus is as likely to extend with it, being only in a state of union from the commencement of this operation, which, if

continued, the poison is uniformly dispersed through the whole of the adjacent parts, forming an animal soap by their commixture. Hence, by such means, a more extended surface is exposed to the action of the absorbents, which are rendered highly irritable, and more active, and in consequence, perhaps, the case becomes more desperate."

"The same argument will equally hold good with regard to the other powerful solvents, as the acids, and the acid preparations, if the poison be not decomposed or removed. If they should destroy the absorbents about the wound, they, previously to this, dissolve the morbid saliva; therefore, the sound parts are likely to become contaminated by them the moment they enter the wound, and hold the virus in solution; for by corroding the muscular parts the poison is diffused. If perchance this poison should happily be discovered to be some peculiar saline compound, or if the poison should be rendered inert, when mixed with the agents already referred to, we might then hope every thing from the application of either acid or alkaline preparations, as we certainly know they possess the power of destroying most organic compounds: but, as we are still utterly ignorant of the chemical nature of this poison, let us prefer imitating and following those methods which appear to present the more wished-for and desired success."

We come now to notice "those methods which appear to *present* the desired success." These are EXTIRPATION and ABLUTION.* It is self-evident that the entire removal of the contagious material will afford the most perfect security, and this is effected with greater certainty by excision of the bitten part, than by any other process. But excision is an operation, when it can be employed, of great nicety and care; not the mere cutting away the part with clumsy haste.

"Much caution and judgment is requisite in excising the bitten part. I have known of failures (and there are some recorded by Dr. Hamilton) where the parts were excised, and

* To which may be added powerful blistering; a remedy which has frequently been used as a prophylactic, by one of the Editors of the Eclectic Repertory, and apparently, with complete success. The decoction of cantharides in spirits of turpentine, See No. 1. of Eclectic Repertory, will probably prove more effectual then the common mode of blistering.

afterwards cauterized; but I am fully persuaded that this arises from want of sufficient attention to some of the minuter circumstances of the operation.

"The first thing requisite, before the excision of the bitten part, is to wash not only the inside of the wound, but also the surrounding parts, with great care; for, if this be neglected, and the poisonous saliva be not removed, in making incisions on each side of the wound, the sound parts through which they are made will be inoculated with virus. Two incisions should then be made, one on each side of the wound, forming an ellipsis in such as will admit of it, which should be carried to such a depth as completely to remove the part. It should then be carefully examined if there is any part in the piece excised through which the dog's tooth appears to have passed; and in case there is, the excision should be carried deeper. In making the incisions, great attention should be paid to the direction of the tooth; and, if the knife should enter the wound made by the dog's tooth, I should consider it always necessary to recommence the operation with a clean knife, and this as often as the occurrence should take place: for, if we continue to use the same knife, which is likely to be contaminated in consequence of its entering the wounded parts, the operation may be rendered useless by the sound parts becoming inoculated with the canine virus."

These ample directions for the excision of the bitten part, are sufficiently impressive and judicious, we trust, to be indelibly fixed on the operator's mind. To little purpose, indeed, will the surgeon expose his patient to fear and pain, if with his knife he transfers the poison to the parts through which his incision passes. We are so fully convinced of the possibility, and even the probability, of this, that we feel indebted to our author for putting the case with such precision and force. We shall make no apology for pursuing this important part of the prophylactic treatment a little further. Mr. Gillman has given very proper directions for the operation of excision, and has increased the value of these directions by cautions which have left his statement scarcely susceptible of improvement. But there is still a serious question connected with this process: At what period after the infliction of the wound should excision be employed? *Immediately*. Various impediments,

however, arise to prevent this. At what period then after the bite can it be used with a prospect of success? there is great reason to believe at any time after, even when symptoms of rabies have arisen.

"In the determination of the question (says Mr. Gillman) as to the time when extirpation of the parts infected by the bite may be performed, it is of great importance to consider whether the poison does always remain in the substance where it was first infused, until by inflammation, or by some other cause, a sufficient dose is generated to infect the whole system. Indeed, the notorious connection between a painful or inflamed state of the original wound immediately preceding the constitutional symptoms, warrants the supposition, and points out the expediency of removing or destroying the parts to the last."

So far as our own observation and experience have gone, they have met this conclusion. Not more than two years since a man came under our care, who was bitten by a dog believed to be rabid. A few hours after he received a wound on his hand, the bite was cut out, and certainly without precautions suggested by our author. The wound soon healed. In six weeks from the bite he again applied to us. The cicatrix was now elevated, had changed to a livid hue, and he felt a tingling sensation in the part, where the wound had been. Ample extirpation of the part, with an inch and a half of the surrounding sound substance, was had recourse to. He has since felt no inconvenience; neither has the second cicatrix ever assumed the livid hue of the first. It cannot be said, positively, that this person would have fallen into rabies; the symptoms were too threatening to trust to the chance; and the fair conclusion is, that he was saved by the second excision.

It sometimes happens that the bite is so placed as not to admit of excision. In this dilemma the resource is, if we reject caustic, a careful and persevering ABLUTION. The rationale of this is obvious; but there may be some question as to the fluid to be employed. When the choice is not influenced by circumstances, our author uses a weak solution of volatile alkali, in the proportion of one part of the alkali to four of water. With this solution,* (fully capable of dissolving the

* Mr. Gillman ascertained this proportion to be fittest for the purposes of ablution; when stronger it is observed to corrode the solid parts, and pro-

saliva,) the wounded parts should be freely washed, and injections, with a syringe, forcibly made into the wound. After this has been persevered in for a considerable time, it is proposed to use warm water to promote a flow of blood, which may assist in washing away any remaining particle of the poison.

The method here laid down cannot be objected to, but it seems to admit of being extended upon the same principle, both by a combination and arrangement of the several means proposed, and by the introduction of an auxiliary of which Mr. Gillman has noticed the name only; we mean the exhausted receiver, or *suction*. On this last we have one remark to make. If the hazard, incurred by an application of the lips to the wound, be a valid objection, and perhaps it is, it does not extend to the use of cupping-glasses. If after excision, or before, or at any period, it be an object to promote a full flow of blood from the wound, how can this be effected more certainly than by suction? We have therefore no hesitation in recommending cupping, as one, and possibly not the least, effectual part of the prophylactic process.

From a view of the subject then, as stated by our author, and from our own reflections and observations upon it, we shall venture to suggest the following routine, as affording a fair prospect of security from the dreadful effects of this poison. Immediately on the infliction of the bite, assiduous ablution with the first water that can be found, either with or without soap, and this to be continued unceasingly until professional aid is procured. On the arrival of the surgeon, full excision of the bitten part, according to the directions before stated, if the circumstance of situation, or other objections, do not forbid. After excision, ablution again with solution of volatile alkali in water; and, when the flow of blood begins to cease, suction with the cupping-glass. The alternate employment of ablution and the exhausted receiver to be continued many hours. We forbear to fix on a definite time; that must be left to the discretion of the surgeon employed; but we do not know

bably to hold the virus in solution. It is therefore rejected on the principle that induced him to reject caustic, as previously stated. While employing ablution he suggests the propriety of using clean sponges.

why it should not be extended to twenty-four hours. The object is of the last importance; time and trouble are minor considerations. After proceeding thus far, why should not caustic, or some irritating material, be applied to the wound, so as to produce a slough, in the first instance, and afterwards a purulent discharge, for some weeks? Both analogy and very fairly-stated facts countenance this part of the process. It is well known that inoculation for the small-pox succeeds with most certainty when the puncture is slight, and when no inflammation or morbid action ensues until excited by the virus. On the contrary, when much disease takes place in the part where the variolous fluid is inserted, from any other cause than the stimulus of that fluid itself, it is also well known, that the chance for infecting the system, suffers a reduction agreeing with the degree of adventitious inflammation. In the case of Bellamy (Med. Observ. and Inquiries,) the wound was small, and soon healed,—he died rabid. In the case of his servant, bitten by the same animal and nearly at the same time, the wound ulcerated and could not be healed for many weeks,—she recovered without any symptoms of rabies. We do not state this as a conclusive fact; but it is strong presumptive evidence, supported by close analogies.

The objections to the use of caustics, drawn from or supported by the chemistry of the day, though ingeniously put, carry with them no conviction. The chemistry of life, if the expression may be permitted, differs so much from that of the crucible and the furnace, that facts drawn from the latter, with a view to explain the principles and actions of the former, lead into endless labyrinths of fallacy and error. We agree thus far with our author, however, on the subject of caustic: it should never be a primary application, but, for reasons previously stated, should close the prophylactic process.

Upon the preventive remedies, supposed to act on the system, we must not waste time. From the *Pulvis Antilyssus* of Dr. Mead, to the clumsiest *Mad-dog drink* that cunning ever imposed upon credulity, all is mistake or deception. They have always been worse than useless—they have sunk the patient into idiotic security—and the dreadful symptoms of rabies have awakened him, too late, to a sense of his condition.

The third and last section treats of the "*Consequences of the Bite of a Rabid Animal.*" Over this we shall rapidly pass. It is painful to record events unsustained by a single instance of success. Every remedy employed against the disease, excited by the rabid virus, has hitherto proved inert, even to moderate the symptoms. To recount their names, doses, and effects, is but giving a muster-roll of deaths. In consonance, however, to the principle which has influenced us throughout our observations on this Dissertation—that of presenting to our readers those facts which the author has taken from nature, we shall cite a case of rabies which fell partly under his own observation, and is partly copied from the notes of Mr. Scudamore.

"December 13th, 1807. James Anderson, aged 14, of slight unhealthy aspect, subject to frequent headachs, was yesterday at noon attacked with rigors, succeeded by hot fits, and this morning (Sunday) had all the symptoms of hydrophobia, of which he died the night following. About an hour before his death, he had an interval of reason, and gave a full account of the accident. From him and from his mother were learnt the following particulars of the case preceding the attack:—A dog ran into the stable which he was cleaning, and bit him in the under lip. A few days after he complained to his mother that it pained him. She examined it. Being ignorant of the cause, and considering it only a chop, she applied tallow to it, and no further notice was taken of the wound. In about a week or ten days he complained of giddiness and pain in his head, which, as he was subject to, gave no alarm. About this period also he began to spit unusually: this continued for a fortnight, so as to excite his mother's fears lest he should be consumptive. He passed his nights indifferently, and in uneasy sleep. On Wednesday, three weeks subsequent to the bite, he made serious complaint of his head and the wounded part, which was on the left side: it throbbed with violence, the pain extending to the ear. The mother, considering these symptoms as only a cold, applied camomile fomentations to the side of the face, and gave him some warm gin and water, which appeared to relieve him. He then went to bed, but slept little, and continued occasionally to complain of his head. At this

time, however, and during Thursday and Friday, he ate and drank without any inconvenience. On Saturday he lost his appetite; and, while employed in cleaning his horse, which it was his occupation to drive about in a water cart, he felt alternately cold and hot, and was obliged to discontinue his employment. He complained of thirst; the phlegm was viscid, which he spat vehemently, desiring those around him to remove, as he feared they would suffocate him. During the night he made a violent attempt to get out of bed, which those around him resisted. He very angrily remonstrated with them, but soon became calm. This morning (Sunday) his mother, being alarmed, sent to Mr. Scudamore, who found that he had passed a restless night, was extremely agitated, had great anxiety of breathing, and complained of a slight sense of constriction across the upper part of his chest. His eyes were suffused, and the pupils dilated; tongue dry, and furred in the middle, but moist at the edges; pulse from 80 to 100, quickly varying; countenance melancholy, and expressive of great distress: had much of the characteristic spasm in attempting to swallow. Calomel and opium were administered. Three P.M. Mr. Scudamore saw him again; pulse 90; he had taken eight grains of calomel and six of opium, and had swallowed also about half a pint of toast and water, but with great difficulty and distress, requiring his head to be held. Six P.M. I first saw him. He was dosing; but, on my entering the room, he was instantly seized with a convulsive sigh, and sprang up in the bed suddenly. He was perfectly rational, but spoke in a melancholy tone, and complained much of sickness, which he said prevented his drinking. He had a slight pain about the scrobiculus cordis, but no pain whatever about the throat. When requested todrink, he was again seized with aconvulsive inspiration, and answered quickly, he would do it if he could. He then called to his mother to hold his head, seized a cup which was offered to him filled with toast and water, and with many convulsive sighs, and with much difficulty, swallowed the greatest part of the fluid contained in it. He complained soon again of thirst, but said sickness at his stomach prevented him from drinking any more. Half a lemon lying on the table in the room, I requested him to squeeze a little of the juice into

his mouth; but he complained again of much sickness, and would not attempt it, though his thirst was great. However, as I wished him to rub his tongue only with the lemon, he at length consented; but he had as much difficulty in carrying it to his mouth, and placing it on his tongue, and was nearly as much agitated, as in swallowing the toast and water. He appeared drowsy from the opium, and was disposed to sleep; but, when he lay down for a few minutes and attempted to doze, he was suddenly seized with a convulsive inspiration, and as suddenly jumped up in the bed, called for his mother, and was much agitated and distressed. At eight o'clock I saw him again. He said his head was much relieved since the morning; suffered no one to touch him but his mother. Pulse 80, extremely tremulous. Eleven at night, I repeated the visit. He had passed a pint of urine, was still sensible, but much agitated, and sighed more frequently. Pulse 90, hard and tremulous. Any new question that was now put to him, the least motion in the room, the drawing the bed curtains, stirring the fire, or any little noise whatever, was immediately succeeded by a convulsive sigh, and increased his anxiety and distress. The proposition of placing him in the warm bath so alarmed him, that it was not put into execution. The nausea still continued; he could not be prevailed upon to drink, and was much distressed with flatulence. Twelve at night, all the symptoms the same, and he knew those around him. Mr. Scudamore again proposed to place him in the bath. He assented to the proposition; heard, as he observed, the reasoning upon it mildly, but requested him in the most anxious manner to wait. When he offered him drink, he refused it quickly and emphatically, but in terms of great civility. He passed his urine a little at a time. After a considerable persuasion, he got from the bed, but would not go into the bath: had no intestinal evacuation. Took his powders nearly every hour, which consisted of three grains of calomel and three of opium. Mr. Scudamore's assistant remained with him during the night, who reported, that he was more tranquil till half past two, when six grains of calomel and opium were given him in jelly, which he had great difficulty in swallowing. Dozed, but was disturbed with frequent spasms, till near four. He then became extremely rest-

less. Pulse 120. When toast and water was offered him, it increased his agitation, and his pulse to 132. Asked at five o'clock for toast and water, which increased his spasms violently. Pulse 100.

"Monday, December 16th. All symptoms the same as yesterday; spasms as frequent, but more feeble; continued the opium and calomel as often as he could be made to swallow. Musk and camphor were now administered by the advice of Drs. Marcet and Yelloly, who visited him, but he could not be made to swallow more than one dose. In the evening he was much exhausted by the disease: he called frequently for tea, which he drank eagerly, but with much agitation. He succeeded in swallowing several small teacups full, and ate a small quantity of cake. He seemed pleased at the efforts he had made in swallowing, exclaiming "well done! at it again;" but vomited all he took soon after. He now became so extremely irritable that he would not allow his mother, nor in short any thing, to touch him. These symptoms increased till within two hours of his death, when he had a calm interval, and requested to see his companion who was bitten at the same time with himself. He then related the circumstance of his 'having been bitten by a large dog, as big as the coachman's, with long ears that reached to his nose.' At length he gradually sunk; his hands and feet became cold; he rose up in his bed, fell back, muttered, and expired."

We could add to the value of this article by inserting, from the appendix, a well written case of *Rabies*, by Mr. Carlisle; but we have already, perhaps, notwithstanding the interesting nature of the subject, trespassed too much on the time of our readers, and must hasten to a conclusion.

The impression made on our minds, upon reading this Dissertation, was, that of its being the production of a man of strong intellect, and a close observer of nature. The facts he relates from his own knowledge are interesting, generally, and sometimes have an air of novelty. The history of the appearances in the stomach of the rabid dog, accompanied with a plate, we believe to be new, so far as regards any printed account illustrated by an engraving. His cases are detailed with minute precision, and he has added to the prophylactic pro-

cess important precautionary directions. His selections from other writers, made to fill up the picture, will be useful to the tyro; but those who have left the schools will only be impressed with the result of his own individual knowledge, as having the chance of communicating new facts, and presenting novel illustration. With his style we are not quite satisfied, and we could object to some of his conclusions. The cure of rabies he has left as he found it—hopeless; but he has enforced, most judiciously, the prophylaxis. We must consider this Dissertation to be a valuable addition to the stock of medical knowledge on Rabies Canina.

An Inquiry into the Process of Nature in Repairing Injuries of the Intestines: illustrating the Treatment of Penetrating Wounds, and Strangulated Hernia. By BENJAMIN TRAVERS, Demonstrator of Anatomy at Guy's Hospital, Surgeon to the Hon. East India Company, and to the London Infirmary for Diseases of the Eye. 8vo. London. 1812. Pages 384. Longman, &c.

[From the London Medical Review, for April 1812.]

A BETTER exposition of the general plan of this instructive and interesting inquiry we cannot offer to our readers, than will be found in the following extract from the preface to the very valuable performance now before us. " Minute attention to the operations of the restorative principle will afford a clue to the rational treatment of those injuries in which it is displayed. Thus we have learned to unite wounds by adhesion, instead of leaving them to be filled slowly up with new matter —to rupture the capsule of the opake crystalline, in order to bring about its solution in the aqueous humor—to tie the diseased artery, more effectually to cut off the supply, and force the collateral circulation; and in the work which I now lay before the profession, my object has been in like manner to take a lesson from nature. I have endeavoured to ascertain the plan and limit of her operations in an important class of injuries, to compare the facts of history with the results of ex-

periment, and from these sources to derive a rational and consistent theory of treatment."

The particular circumstances which induced Mr. Travers to institute this inquiry, he has likewise very distinctly stated in the introduction; and they are at once so curious and so important, that they will, we have no doubt, appear to all as they have done to us, loudly to demand and abundantly to justify the undertaking.

"The numerous examples of spontaneous recovery from wounds of the intestinal canal, and our imperfect acquaintance with the method of cure which nature adopts in these cases, were the circumstances which led me to the present inquiry. I was additionally urged to prosecute it, by observing the varieties of opinion which embarrass the practice of surgeons, and the questionable tendency of their proceedings in cases of mortified hernia. The frequent success of the operation of nature in such cases, and the frequent failure of the contrivances of art, are demonstrated by a reference to the sources of professional information; and I trust it is unnecessary to argue the importance of an inquiry into the cause of this humiliating distinction."*

The ancient opinion was that wounds of the intestines, by permitting the efflux of their contents and causing inflammation, were certainly mortal. It was found however, that, in fact, men frequently recovered, though weapons had passed through their bodies, and hence it was conjectured that these had absolutely transfixed the abdomen without injuring any of the important viscera. The supposition therefore, was, that such an injury was little more than a wound of cellular membrane, and scarcely of more importance than one of similar extent under the skin. Though it was difficult to conceive how a weapon could pass in this manner, yet the idea prevailed, till several instances occurred of wounds attended with discharge of blood, or of the missiles by which they were inflicted, by the natural passages, or sometimes with perceptible efflux of the contents of the viscera, and which wounds, nevertheless, were followed by recovery. Many such cases are recorded by authors, and of

* Introduction.

these that so often quoted from Mons. Littre is among the most remarkable.

"A man, æt. 34, of a robust constitution, who was occasionally the subject of mental derangement, inflicted eighteen wounds upon his body with a knife, the blade of which was five inches long and seven lines broad at the handle. Of these wounds eight had penetrated the abdomen. Tension of the belly, difficult and painful respiration, nausea, and vomiting ensued. Blood was passed by the mouth and by stool. By means of copious bleeding and a strict regimen, the patient recovered in the course of two months. During the cure the body was preserved in the supine posture, that, if possible, the effusion which was expected might be restrained; for, from the direction and depth of the wounds, and the passage of blood by the bowels, no doubt was entertained that these parts were penetrated. In a returning paroxysm, eighteen months subsequent to the former violence, the unfortunate man destroyed himself by leaping from a window three stories high. This event afforded M. Littre a highly interesting opportunity of ascertaining the existence and mode of reparation of the intestinal wounds. It is sufficient for my present purpose to say, that the jejunum and colon presented extensive cicatrices."*

John Hunter during his service in the army, as well as in his general practice, met with cases of this kind, and traced the mode of reparation to that general law of adhesive inflammation, the phenomena of which he had more especially set forth. He did not so much discover any new fact, as constitute a class of facts already known into a general law. He showed, that certain parts of the body when divided, had a constant tendency to adhere, and with regard to the particular instance of wounded intestine, he gave proof that this tendency was brought into action in twenty-four hours. He therefore justly attributed the occasional freedom from important injury to this rapid adhesion of the edges of the wound to that peritoneal surface to which they were contiguous. He adds a conjecture, that effusion of the contents of the intestines into the cavity of the abdomen, takes place chiefly or solely when the bowel is full, or

* Inquiry, page 21.

the wound large, and asserts that where a bullet in its rapid passage has injured, but not broken the gut, and when in consequence the gut after some time yields, and pours out its contents externally, there is never any danger of internal effusion, the parts round the slough being closed by the same process of adhesion. Mr. John Bell has also insisted on this process of quick union; and has further opposed those who argue from the mischievous effects of air on shut cavities, by showing that, from the perfect fulness of these sacs, air cannot enter them without considerable force. He adds, that this fulness preserves the intestines in the same relative position, and in mutual contact.

Such seems to have been the state of known facts, and of common opinions, in respect to wounds penetrating the abdomen, when Mr. Travers entered on his inquiry. By numerous experiments he has ascertained, that the general opinion of the frequent occurrence of effusion from wounded intestines is erroneous; that in fact it does not take place in a great majority of instances: and that it occurs only from a large wound in a distended bowel; or where, as he has proved by various cases, air is extravasated or blood poured out into the belly; for by these fluids less resistance is made to the escape of fæculent matters.

As it has been known since the dissection by Littre, confirmed by several subsequent cases, that the intestines may be extensively penetrated, and afterwards closed by cicatrization or adhesion with little inconvenience, it may be asked of what use it is to multiply experiments, to thrust swords into the flanks of horses, and impale dogs upon catlins in proof of the fact. This may possibly have been done with too free a hand; but the use of it we conceive to be this: it proves that what have been regarded merely as exceptions, in truth constitute the general rule; that the ready tendency of the peritoneum to adhesive inflammation, which had been witnessed in some instances, and justly expected in many, does invariably occur with a most saving celerity, for our author has afforded demonstration of its existence in seven hours; and it tends therefore not only to increase our hopes of a happy event in such perilous cases, but it proves to us the means by which it is to

be promoted. By diminishing our despondency, it adds to our watchfulness and perseverance in enjoining quietness and abstinence, leads us to watch with anxiety for the approach of general inflammation, and, on its appearance, to use the only means in our power, bleeding, with a freedom which can only proceed from a well grounded prospect of success.

Mr. Bell lays it down in the beginning of his valuable chapter on this subject, that "a wound of the belly is a mortal wound,"* that it is so by inflammation, and that a common cause of such inflammation is shown in the fact that "if an intestine be wounded it pours out its fæces into the abdomen." In this same chapter Mr. Bell has certainly cited numerous cases in which these wounds were not mortal, in which no effusion or inflammation had occurred, and he has ably and forcibly shown the modes by which the mortality has been obviated by nature. Still he regards such examples as exceptions to the general law.

"In one short sentence we announce the general principles of such wounds,—in one short and general prognostic we declare them to be fatal; we thus bestow but a few moments on their general character, while we spend hours in marking their lesser varieties, and in recording all the accidents and chance causes, collecting evidence about hair-breadth escapes, till we almost lose sight of the general principle which proves such wounds to be mortal. This confusion must be peculiarly felt by a diligent student, who, the more he reads, the more he wanders, finds anuses at the groin, and miraculous recoveries in every book, and reads of cures till he forgets that there are dangers."†

Now Mr. Travers has proved recovery fro ma punctured wound in the intestine not to be a miracle. He has proved what Mr. Bell supposed to be a frequent process, to be a constant one, and in so doing we are confident that he has added much to the just and persevering treatment of such cases. His details are too minute to be extracted, but we think the dissections, after several of his experiments, highly important as well as

* Discourses on Wounds, part 2, page 56. † Ib. 59.

curious, and we consider his practice to be rational as well as bold.*

A curious fact is shown in regard to one species of a ruptured intestine, namely, that in which no wound occurs in the parietes. Such injuries generally admit of effusion into the abdomen, and are consequently fatal. Of this fact the following simple solution is given by our author.

"I should explain it by the difference in the nature of the injury which the bowel sustains when perforated by a sword or bullet, as in the one case, or burst or ulcerated as in the other. A rupture by concussion could only take place under a distended state of the bowel, a condition most favourable to effusion, and from the texture of the part, a rupture so produced would seldom be of limited extent. The process of ulceration by which an aperture is formed commences in the *internal* coat of the bowel, which has always incurred a more extensive læsion than the peritoneal covering. The puncture or cut is merely a solution of continuity in a point or line, the ulcerated wound is an actual loss of substance. The consequence of this difference is, that while the former is small, is glued up by effusion from the cut vessels, or, if large, is nearly obliterated by the full eversion of villous coat, the latter is a permanent orifice.†

Recent writers have strangely overlooked an effect of wounded intestine noticed by Haller, and fully confirmed by the experiments of our author; the above named eversion of the mucous coat.

"If a gut be punctured, the elasticity of the peritoneum, and the contraction of the muscular fibres open the wound, and the villous or mucous coat forms a sort of hernial protrusion, and obliterates the aperture. If an incised wound be made, the edges are drawn asunder and reverted, so that the mucous coat is elevated in the form of a fleshy lip. If the section be transverse, the lip is broad and bulbous, and acquires tumefaction and redness from the contraction of the circular fibres behind it, which produces, relatively to the everted portion, the appearance of a cervix. If the incision is according to the length

* Inquiry, page 75. † Ib. 46.

of the cylinder, the lip is narrow, and the contraction of the adjacent longitudinal, resisting that of the circular fibres, gives the orifice an oval form. This eversion and contraction is produced by that series of motions which constitutes the peristaltic motion of the intestines."*

This effect it is of importance to bear in mind.

In order to ascertain how great a degree of injury nature might be able to repair, Mr. Travers divided the small intestine of several dogs to the mesentery. The result was death in all, from effusion of aliment if the animal had been recently fed, and if it had fasted for some time, from inflammation, attended by separation of the ends of the divided gut, eversion of the mucous coat, and obliteration of the cavity, partly by this eversion and partly by a plug of coagulated chyle. The same effects followed a division of three quarters of the cylinder. When half the canal was divided, a curious pouch was in one instance formed round the injured bowel.

"A pouch resembling somewhat the diverticulum in these animals, was formed opposite to the external wound, on the side of the parietes, by the living peritoneum, on the other side by the mesentery of the injured intestine, that intestine itself, and an adjacent fold which had contracted with it a close adhesion. The pouch, thus formed and insulated, included the opposed sections of the gut, and had received its contents. The tube at the orifices was narrowed by the half eversion, but offered no impediment to the passage of fluids."†

Though our author did not succeed in producing this pouch in more than one instance, he yet conceives it probable, that in accidental wounds, when the bowels remain *in situ*, and are uninjured by being drawn out and handled, this effect may more frequently occur. Whether this kind of sac would have allowed the intestinal action to have continued, our author professes himself unable to decide. He regards retraction and eversion as the evils which prevent the healing process: these occur to a great degree, the injured parts cannot unite from distance, and the mucous membrane is indisposed to adhesive inflammation. In consequence he conceived, that if the canal

* Inquiry, page 85. † Ib. 96.

could be perfectly divided by means which yet prevented retraction, the same consequences would not ensue. To put this opinion to the proof, a ligature was drawn tight round the duodenum of a dog, which at first was indisposed, but afterwards perfectly recovered, and was killed. The canal was indented but continuous, though the mucous coat was deficient at the point of division. A longitudinal incision, one inch and a half in length, was spontaneously repaired by adhesion.

The foregoing observations chiefly relate to wounds beyond the hand of the surgeon. Another class of injuries consists of those in which the wounded bowel protrudes, or effuses its contents immediately underneath the external wound, through which they pass. Numerous instances of this kind are on record, and great doubts have been entertained as to the proper mode of treating such complicated cases.

It has been taught upon high authority, that where an intestine is lying at the bottom of an external wound, pouring out fæces, it ought to be laid bare, and the wound stitched. By an abundant record of cases and experiments, it is here shown that this process can never be required, for the same quick union which closes a wound inflicted deep in the belly, will, in the above noticed instances, consolidate the edges of the wound with the adjacent parietes. Effusion into the abdomen is thus effectually precluded, and in process of time the external wound will generally close over the intestine, and the fæces pass by the natural outlet.

Those who have witnessed this rapid adhesion, have applied its principle to slight wounds which are absolutely within our power, and have directed that such should either be returned simply, or reduced with a ligature on the mesentery to retain them in contact with the external opening. Cases have occurred in which each of these practices has been followed, and in which the injury has been repaired by cicatrix, or by the more tedious process of granulation. In other instances even slight punctures and cuts have been surrounded by a ligature, or stitched, and have done equally well. As, therefore, there is a possibility, in simply returning the injured gut, that effusion may occur, and as in keeping the external orifice open by the use of a ligature on the mesentery, a more tedious process is established, there

seems to be no adequate reason why this chance, or this delay should be encountered, as it does not appear that the ligature on a simply wounded and uninflamed gut, produces any additional irritation though it adds to the security.

"The grand objections to the practice of returning a wounded intestine without a suture are—the heavy drain upon the system, if, as is probable, the drain be alimentary;" in cases where the wound is large and effusion has actually occurred, "the irritation occasioned by the continual discharge, and the tardiness of the healing process—the danger of future impediment to the free course of these matters, from a permanent angularity of the adhering fold, or the encroachment of the parietes upon the tube in healing; and lastly, of future prolapse, and even of artificial anus, from the actual deficiency of the paries intestinalis, corresponding to the extent of the cicatrix."*

When therefore we have the bowel absolutely in our hands, we can readily close it. When the orifice is very small, it may be surrounded by a ligature, but where it is large, considerable doubts have arisen as to the proper mode of effecting the closure. Various experiments have been made to ascertain the point, and much contrariety of opinion has existed. We have been advised, where the whole cylinder has been severed, to introduce the upper within the lower portion of intestine, and to sew them in that situation. This is not, as Mr. John Bell asserts, "an untried experiment." It was tried long ago with success by Ramdohr, and has been often imitated in experiments since, though not with equally fortunate events; the chief difficulty being to introduce one portion of gut within the other, on account of the contraction and eversion with which each end is affected. In cuts of greater or less extent some have recommended the use of a single stitch, others two or three interrupted stitches, and others again have preferred the uninterrupted suture. A large proportion of writers direct, that in each of these methods, but more especially in the two former, a ligature on the mesentery should confine the returned bowel to the external wound.

* Inquiry, page 185.

Mr. John Bell, who is at all times so ready to reprehend his immediate competitor for writing fearlessly on what he had never seen, says,

"If it should happen that a gut is cut fairly across in all its circle, the mesentery still has its hold upon each end of the divided intestine; and the two ends of the intestine can never be far separated from each other; nor can the one end be introduced so far within the other as to make the double row of stitches round and round, the one row distant from the other an inch. It is not by this thorough stitching that such a gut is to become sound; it is only by adhesions, and by two adhesions taking place at the same time. The two ends of the gut may be made to adhere to each other; and the prudent way of favouring these adhesions, is to introduce the one piece of intestine a little way within the other, and make one single stitch in that part of the circle which is farthest from the mesentery, and then draw the gut, by means of that thread, close up to the wound, and thus it will probably happen that the mesente will keep its side of the circle firm, that the stitch will keep the opposite side firm, that the gut being drawn by the thread and pushed from behind, and flattened by the universal pressure within the abdomen, the double adhesion may take place, viz. of the surfaces of the intestines to each other, and of the wound of the intestine to that part of the inner surface of the belly where it is open and inflamed by the outward wound."*

Mr. Bell has cited no authorities for the above assertion, and he probably never knew an instance at all resembling that which he has supposed. Those who have made the trial have found, that it is nearly impossible in all cases, and quite so in by far the greater number, to introduce one end of the divided gut within the other even a little, by reason of that eversion of the mucous coat, and contraction of the gut of which Mr. Bell does not seem to have been aware, since he no where speaks of it: it has been also found that the single stitch affords no effectual security for the adhesion. It did not require the accuracy and minute research of Mr. Travers to oppose the futility of these declarations. Dr. Smith of the Philadelphia Medical

* Discourses on Wounds, Part 2. page 119.

Society sewed wounded intestines in dogs, as nearly as possible according to this plan, and invariably found it to fail, though he has unaccountably omitted to mention the minute particulars which occasioned the failure. Mr. Travers has proceeded much further, and with more scientific research, and has found union prevented by the eversion of the mucous coat, which neither assumes the adhesive inflammation, nor seems disposed to granulate. When an intestine then is extensively wounded, and a single stitch only employed, it does not prevent retraction and eversion, and consequently does not prevent a fatal efflux of its fœcal contents. We cannot refrain from quoting those decisive facts which place this question finally at rest.

"I divided the small intestine of a dog which had been for some hours fasting, and carried a fine stitch through the everted edges, at the point opposite to their connection with the mesentery. The gut was then allowed to slip back, and the wound closed. The animal survived only a few hours.

"*Examination.* The peritoneum appeared highly inflamed. Adhesions were formed among the neighbouring folds, and lymph was deposited in masses upon the sides of the wounded gut. These presented two large circular orifices. Among the viscera were found a quantity of bilious fluid, and some extraneous substances, and a worm was depending from one of the apertures. By the artificial connection of the edges in a single point of their circumference, and their natural connection at the mesentery, they could recede only in the intervals, and here they had receded to the utmost. The suture prevented the contraction of the circular fibres, from the obliquity produced by the more powerful action of the longitudinal between the two fixed points. All circumstances therefore combined to facilitate effusion, the obvious cause of the quickly destructive inflammation.

"I increased the number of points of contact by placing three single stitches upon a divided intestine, cutting away the threads and returning the gut. The animal refused food, and died on the afternoon of the second day.

"*Examination.* Similar marks of inflammation presented themselves. The omentum was partially wrapped about the

wound, but one of the spaces between the suture was uncovered, and from this the intestinal fluids had escaped. On cautiously raising the adhering omentum, the remaining stitches came in view. Here again the retraction was considerable, and the intervening elliptical aperture proportionally large. On the side next to the peritoneum, however, the edges were in contact and adhered so as to unite the sections at an angle.

"From these experiments it appears, that opposition at a point or points, is as respects effusion, more disadvantageous than no opposition at all; for it admits of retraction and prevents contraction, so that each stitch becomes the extremity of an aperture, the area of which is determined by the distance of the stitches."*

As such methods do not succeed then, what are more effectual? Mr. Astley Cooper and Dr. Thomson have instituted experiments, the apparent object of many of which was to estimate the comparative efficacy of the interrupted and continued suture: and the result has been that each has been successful. Such an issue is perfectly explicable by the experiments of our author, who shows, that a cut intestine, deep in the belly, sometimes heals by the adhesion of its edges to each other, like other divided parts, though it is more frequently closed by the union of its edges, when remote from each other, to the neighbouring parts. When the ligature is used, the former of these processes, as he further proves, is alone to be depended on, and that to secure its success accurate contact is required. Whatever ensures this contact will be efficient, and provided this object be attained, it is indifferent what form of ligature is employed for the purpose. So decidedly do our author's conclusions differ from those of Mr. John Bell, that we think it may not only be amusing but instructive to place them in contrast before our readers.

"I have endeavoured to represent the real condition of a wounded bowel and the easy cure of it, in that simple form in which I have conceived it. I have advised that one single stitch only should be struck through the wounded bowel, and then drawn also through the wound. And I have ventured

* Inquiry, p. 116.

moreover to say that if there is in all surgery a work of supererogation, it is this of sewing up a wounded gut. The mechanical and vulgar conceptions of those who believed that a wounded intestine is closed not by inflammation, and the adhesions of contiguous parts, appears to me offensive to a degree which I shall hardly venture to express to you. But it strikes deeper and wider than this; it is not offensive only; it is dangerous; for while I take an interest and find only a pleasant labour in teaching the young surgeon what is right to do, and what is consistent with the simple ways of nature and the economy of the living body, he is seduced by a formal account of most curious and ingenious methods of sewing a gut, and is drawn aside to follow after such puerile conceits, thinking to do more than even nature can do in such a case."*

Another subject of difference has arisen in regard to the mode of disposing of the ends of the ligature after the suture has been made. Mr. Benjamin Bell first pointed out the propriety of cutting the ligature close to the gut, and returning it into the abdomen unconnected with its external wound.

"It is probable, whatever suture may be employed, if more than one or two stitches have been passed, that it will be very difficult and even uncertain our getting the ligature away, without hurting the intestines more than we ought to do. I would never advise therefore, with any view of this kind, that the ligature should be left out at the wound; less danger will arise from cutting it entirely away and allowing the stitches to remain. A considerable part of it will fall into the cavity of the gut."†

Mr. Bell does not adduce any facts in support of this assertion, but Dr. Thomson, in order to decide the point, made several experiments, the results of which were that the ligatures tied on the outside of the intestine were found within its canal. This fact has been confirmed by the observations of our author, who gives the following solution of the appearances.

"The fact of reparation by artificial connexion of the divided parts being established, it remains only that I should point out the several stages of a process, which has not, to my know-

* Discourses on Wounds, Part 2, page 108.

† System of Surgery. Vol. 2, page 128, 7th Edit.

ledge, been described. It commences with the agglutination of the contiguous mucous surfaces, probably by the exudation of a fluid similar to that which glues together the sides of a recent flesh wound, when supported in contact. The adhesive inflammation supervenes and binds down the reverted edges of the peritoneal coat, from the whole circumference of which a layer of coagulable lymph is effused, so as to envelope the wounded bowel. The action of the longitudinal fibres being opposed to the artificial connexion, the sections mutually recede as the sutures loosen by the process of ulcerative absorption. During this time the lymph deposited becomes organized, by which further retraction is prevented, and the original cylinder, with the threads attached to it, are encompassed by the new tunic.

"The gut ulcerates at the points of the ligatures and these fall into its canal. The fissures left by the ligatures are gradually healed up; but the opposed villous surfaces, so far as my observation goes, neither adhere nor become consolidated by granulation, so that the interstice marking the division internally is probably never obliterated."*

In conformity with these facts, Mr. T. decidedly recommends the use of a ligature so as to secure accurate contact, the removal of the ends of the ligature close to the knot on the gut, and the careful reduction of the injured part. In all instances indeed of protruded bowel, he strenuously insists on the necessity of its cautious and orderly return in the inverse order of its protrusion, being satisfied that mere displacement acts as a frequent cause of active inflammation in the peritoneum.

The most interesting part of this investigation relates to mortified hernia. It must be sufficiently known to our readers, that an infinite variety of opinions has existed, and does still exist, in respect to the proper mode of treating this shocking malady. Of this variety a most interesting account is given in the last three chapters of the present work, which concludes with a detailed statement of that which the author has been led to prefer.

Littre recommended that the lower portion of the canal

* Inquiry, &c. page 123.

should be tied, after excision of the mortified cylinder, and that the upper should be retained at the wound, to form there a permanent artificial anus. La Peyronie, unable to distinguish the upper from the lower orifice in one instance, retained them both at the wound which closed over them, and the continuity of the canal was maintained. In other instances, therefore, he followed the same method, endeavouring as much as possible to approximate the ends of the severed intestine, but in these attempts he met with little success. Ramdohr, after similar excision, thrust the upper within the lower part of the bowel, and sewed them together. He succeeded in one case; as did also Duverger, who introduced a piece of calf's trachea within the canal. Petit simply dilated the stricture and opened the mortified coats of intestine. In several instances which occurred to him, free incisions into the sphacelated parts were the only operation, and this was successful. Similar events occurred to Gooch, who perfectly accords with Petit, in thinking that the cure of these cases is due more to nature than to art; and that the province of the surgeon should be restricted to the removal of whatever might obstruct her proceedings. Louis objects to cutting the stricture where the gut is adherent; he merely removes the mortified parts, leaving the sound untouched. Where the gut does not adhere, he cuts out a portion of cylinder including the spoiled part, and follows the operation of Ramdohr or of Peyronie. Sharp recommends excision of the sphacelus, the enlargement of the stricture, and the closure of the gut by the interrupted suture. If the latter cannot be effected he unites the divided intestine to the wound.

" Richter, whose treatise on hernia discovers a profundity of research, and an extent of personal observation in his time unparalleled, is elaborate in his discrimination of the several stages of gangrene and of the treatment which they respectively demand. If a suspicious spot appears upon the surface of a strangulated gut, he reduces it with a ligature of the mesentery. If it penetrates the coats of the bowel, and the intestine adheres, he dilates the ring; but instead of reducing the gut, leaves it in the sac. If the gut so affected is loose and unadherent, he fixes it by a ligature on the outside of the ring, and cuts away the dead part, leaving only a sphacelated margin to

be separated by nature. On the second day he reduces it, taking care to place the opening exactly behind the ring. If only a part of the circumference of a gut is strangulated and in a state of gangrene, he leaves it wholly to nature, refraining from the incision of the stricture. If many small spots and small openings appear in the strangulated intestine, he adopts the same practice; but if they are extensive as well as numerous, he excises the whole piece, and treats it as if totally gangrened. When this is the case, he excises the dead part; and if unadhering, confines the sound extremities by a ligature to the mouth of the wound. He then clears the canal by means of a purgative and a clyster, and leaves the ultimate disposal of the parts to nature."*

Pott confines a partially mortified intestine by a ligature on the mesentery to the wound; but excises a completely gangrenous cylinder, and unites the ends by suture, confining the returned gut to the parietes. If the ends cannot be brought together, he confines both to the wounds. Chopart, Desault, and Sabatier return small spots as just mentioned, but open the larger spots. After describing the symptoms of mortification in a strangulated hernia, Mr. Cooper says,

"The hernia now sometimes returns into the cavity of the abdomen without assistance, and the patient survives but a few hours, but sometimes the skin over the tumour sloughs, the intestine gives way, and the fæces being discharged at the opening, the symptoms of strangulation soon after cease. When this happens, the intestine contracts adhesions to the hernial sac. The portion which has been mortified sloughs away, and an artificial anus becomes established, through which, generally during the remaining part of the patient's miserable existence, the fæces are constantly discharged. However it sometimes happens that when the intestine has sloughed, that a reunion takes place of its extremities, the extreme wound gradually heals, the artificial anus is closed, and the fæces resume their natural course."†

"In performing the operation for strangulated hernia, where the intestine is mortified, the appearance which it assumes, is

* Inquiry, Page 290. † Cooper on Hernia, Part I. Page 33.

that of a dark purple, or leaden colored spot, or spots, which readily break down under the impression of the fingers. The other part of the intestine is of a chocolate brown color, which has been often mistaken for mortification, but its color and its firmness prove that it has not advanced to that state. Every part of the surface of the intestine is covered by coagulable lymph of a brown color."

"If a small hole only has been produced, the intestine should be returned into the abdomen, excepting that portion of the cylinder in which the hole exists. A needle and ligature should be passed through the mesentery at right angles with the intestine, to prevent its including the branches of the mesenteric artery, which supply that part of the intestine, and then through the mouth of the hernial sac; and, tying the threads, the intestine becomes confined to the mouth of the sac, and the fæces pass readily from the opening by the wound, but will in part take their course by the rectum. As granulations arise and the wound becomes closed, the opening in the intestine is gradually shut, and an artificial anus is effectually prevented."*

"When the whole cylinder of the intestine is mortified, it is necessary to proceed very differently. Then the mortified part of the intestine should be cut away, and the ends are to be brought in contact, and confined by means of four ligatures."†

"If the intestine has a large opening in its side occupying one half of its cylinder, it is, if left to nature, sure to produce an artificial anus. Sufficient of the intestine is not then remaining to conduct the fæces in their proper channel. The wound heals so as to form an orifice sufficiently large to prevent the escape of that portion of the fæces which the intestine cannot convey, and if it heals further than to that point, abscesses frequently form, which, when they burst, discharge, with the matter, a considerable quantity of fæces."‡

"As it appears, therefore, that there is little probability of relief to the patient, when this state is once established, the surgeon should attempt, by all the means in his power, to prevent its occurrence.

"The means which will occur to the mind as being most

* Cooper on Hernia, Part I. Page 34. † Id. 35. ‡ Id. 38.

likely to effect the object, will probably be to make an uninterrupted suture upon the opening in the intestine, but this treatment would leave the intestine with only half its cylinder, the fæces will not pass, they will either soon burst the stitches from the wound, or it will become necessary for the surgeon to cut them to unload the intestine, and prevent the death of his patient."*

"Instead of endeavouring to maintain a diminished canal by sewing the intestine longitudinally, the surgeon should not only cut out the mortified part, but all the remaining part of the cylinder of the intestine, and then, approximating the extremities of the intestine, he should endeavour to unite it in the manner in which a transverse division of the intestine is treated, by making four sutures upon it, and confining it by means of the mesentery to the mouth of the hernial sac."†

The treatment recommended by Lawrence is "to dilate the stricture, and to leave the subsequent progress of the cure entirely to nature. The sloughs," he adds, "will be cast off; the ends of the gut are retained by the adhesive process in a state of apposition to each other, the most favourable to their union, the wound contracts and often completely closes, so that the continuity of the alimentary canal is perfectly reestablished. The interference of art can only be prejudicial in this process. When we consider the loose state of the intestinal canal, in its natural condition, we find a difficulty in conceiving how its continuity can be restored, after considerable portions have perished: yet indubitable proofs of this fact exist, and induce us to place confidence in the resources of nature."‡

To this statement he afterwards adds, "perhaps the only step, which would be justifiable, is that of making an incision in the sphacelated part; this will promote the evacuation of the alimentary canal, and afford considerable relief."§

When reviewing Mr. Lawrence's first edition, we remarked on the passages above cited, "it remains for the candid observation of those who have the opportunity to determine, whether

* Cooper on Hernia, Part I. Page 39. † Id. 40.

‡ Lawrence on Hernia, 1st Edit. Page 201, 2d Edit. Page 283.

§ Id. 1st Edit. Page 203, 2d Edit. Page 285.

in cases where patients survive the operation, the removal of the gangrenous intestine by the scissars is, or is not, an objectionable practice; and whether it is giving a fairer chance of recovery to second the efforts of the constitution during the process of separation, while we facilitate, by a free opening, the evacuation of the alimentary matters." Mr. Astley Cooper, in the month following that of our publication, operated according to this simple method, and in the appendix to Hey's last edition of his Surgery, he published the case, which was completely successful, and then subjoins the following directions, "as an answer to a query in the London Medical Review."

"From the foregoing history it appears that the proper treatment of a mortified intestine in strangulated hernia, consists in the two following circumstances.

"1st. In dividing the stricture, so as entirely to remove the cause of strangulation; and

"2dly. In making an opening into the intestine so as to give a free outlet for the discharge of the accumulated fæces in the intestine within the abdomen. If the stricture only is divided, the constipation, hiccough, and vomiting continue, but if the intestine is opened, the patient in a few hours becomes relieved of those symptoms."*

We have thus laid before our readers what we believe to be a pretty fair, though a hurried sketch of the most prominent oppositions in opinion, which have existed in respect to this very critical point. With such a puzzle of discordant facts and authorities before him, our author has proceeded to investigate the subject minutely, and to adopt, if possible, a rational system of practice.

He states in the first place that strangulation is twofold, viz. that which checks circulation, as well as the transmission of aliment, through the strictured gut; and that which simply impedes the intestinal function. He affirms that where the perfect strangulation occurs, it is rapid in its progress to gangrene, the unstrictured part of the canal within the abdomen remaining

* Hey's Surgery, Appendix to the last edition.

uninflamed; and that the less firm constriction gives rise to a more protracted state of suffering, with a tendency to general peritoneal inflammation, before the strangulated gut mortifies. This he advances as a general though not an universal truth; and he therefore maintains that abdominal inflammation proceeds not from the local injury of the strictured part, but from obstruction to the action of the bowels. This obstruction, he argues, continued long from any cause, is equal to produce the effect; but the tighter the stricture on a ruptured gut, the sooner nature is likely to relieve herself, by effusing the contents externally, or into the hernial sac.

He next observes, that it is not an object to ascertain, as several have asserted, whether the intestine do or do not adhere to the parietes, for that in every case of strangulation, and consequent gangrene, such a degree of inflammation must have preceded as to have insured a perfect adhesion of the gut at the stricture.

Almost all writers on this subject have expressed surprise at such an union of the ends of a mortified intestine as to maintain the continuity of the canal, after a foot or more has been cast off. Mr. Travers therefore points out, that whatever length of intestine may be lost, still the two extremities are tied down close to each other at the mouth of the sac, adhering all round to the stricture, and by one part of their surface to each other.

"In the ordinary situation of hernia, the portions of intestine embraced by the stricture occupy a position nearly parallel. Their contiguous sides mutually adhere; in the remainder of their circumference, they adhere to the peritoneum, lining or forming the stricture. The existing adhesion of the contiguous sides, strengthened by the adhesion of the parts in contact, insures a partial continuity upon the separation of the sphacelated part. The line of separation is the line of stricture. It commences on that side of the gut which is in direct contact with the stricture. As the separation advances, the opposite adhering sides may perhaps recede somewhat, and a little enlarge the angle of union. But it is ever after an angle; and where the peritoneum is deficient, the canal is simply covered in by granulations from the cellular

membrane of the parietes coalescing with those of the external or cellular surface of the peritoneum."*

In consideration of these facts, and of a conviction that the ligature on a strangulated gut, or on that proportion of intestine immediately connected with the strictured part, is less likely to produce adhesion than inflammation followed by ulcer, our author decidedly prefers the more simple to the more operose modes of proceeding.

Where there is no absolute sphacelus, or only one or two small spots, as these are readily cast off either outwardly or through the canal, he advises the reduction of the bowel, and the use of fomentations, glysters and laxatives.

"Where the gangrene is general or complete, and the matters are discharged through an opening or openings in the gut, a free incision of the sac is all that appears to be required. If the spoiled gut is extensive, the surgeon may use his own judgment concerning the removal of the sloughs, for the sake of cleanliness.

"Where, under the same state of disorganization, the gut has not burst, and the process of sloughing has not commenced, an opening should be made near to the stricture, sufficient to admit of the discharge of the matters."†

"Where the rupture is small, and the symptoms indicate the presence of gangrene, unless the patient is, strictly speaking, in articulo mortis, I would open the rupture by a free incision, treating it as an abscess, so that the fœcal matter should follow the knife."‡

Our author thus acts on the supposition that the inflammation is confined to the strictured part. He cannot, indeed, be absolutely sure of this; but, by such conduct, he gives his patient the fairest chance of recovery. The great object is to unload the intestines: if beyond the stricture they are sound, such evacuation is the most secure mode of preventing inflammation; and if this has already began in the belly, no more effectual means can possibly be employed to arrest its progress,

* Inquiry, &c Page 360. Mr. Lawrence has added to his second edition a somewhat similar account of this process.

† Inquiry, &c. Page 333. ‡ Ibid. 335.

nor can any means without this be efficient for the purpose. He conceives it to be highly prejudicial to sever nature's ligature, to affix his own, by drawing out the sound intestine: and he is extremely cautious in relaxing the stricture by which the mischief has been caused.

"The division of the stricture where an intestine is in a state to resume its functions is indispensable; but the object of the division where an intestine is mortified is to me unintelligible. It is in fact no longer a stricture, the resistance which made it so is taken off by the collapse of the included gut, and the patient can experience no greater relief from the division than the part itself. Nature has anticipated the surgeon; being unable to dilate the stricture, she has accommodated herself, as her custom is, to the circumstances of the case, and accomplished by other means the object of the operation. The gut has been liberated at the expence of its vitality."*

Such is the general rule, which like other general rules is not without its exception; for Mr. T. afterwards says, after opening the sphacelated gut "if the stricture should still be sufficient to retain the matters, which will seldom be the case, a moderate dilatation of it will be required."†

These operations then, do not seem to differ materially from those of Petit and Gooch, which, as we have seen, Mr. Lawrence also has preferred to the devices of more modern days. "To Mr. Lawrence of Bartholomew's Hospital," says our author, with manly and honourable candour, "who has distinguished himself by an excellent Treatise on Hernia, is due the credit of having revived the opinions, neglected or forgotten, of the illustrious Petit."‡

For the after treatment of the case Mr. Travers is very minute, and as we conceive, peculiarly judicious in his directions. We dare not however, venture to trespass any longer on the patience of our readers by quotation. He proceeds on the principle that the lower portion of the canal should be assisted to regain its functions before any attempts are made to close the external wound; a practice, we need hardly say, directly the reverse of that generally adopted. When such cau-

* Inquiry Page, 300. † Id. 333. ‡ Id. 294.

tious treatment is pursued, Mr. T. maintains, that artificial anus is a very rare consequence either of wound or mortification.

Several interesting cases are given to shew that a state of intestine after strangulation frequently occurs, which, though short of grangrene, forms a perfect barrier to the transmission of its contents. An operation therefore, by which such an intestine is returned into the belly is fruitless; the patient dies from continued obstruction, and on examination of the body there appears no inflammation in the general cavity, but the injured gut is found precisely in the state in which it lay in the sac: this state is that of high discoloration with indentation left by the stricture. The part seems to have been paralyzed, and though it would recover its power to act in time, yet the system is unable to endure the intermediate obstruction. In this case we are directed by our author to return the bowel, for it is included in that species of hernia in which "disorganization has not commenced." We presume however, that other directions would have been given if the nature of the injury could be detected previously to the return of the gut. This however is impossible, for no change of colour can suffice to indicate such a state. The change of colour indeed, according to our author, however great it may be, is an equivocal sign of death in the bowel; though the loss of lustre affords an unerring proof of it.

The volume concludes with several curious experiments imitating the processes of strangulated hernia; and with an highly interesting case, detailed by the patient, in which a strangulated, and apparently mortified intestinal rupture, admitted of spontaneous cure without external discharge.

Our readers will perceive, that in the present instance, we have been studious to lay before them rather an analysis of the work before us, than a criticism on it. The enquiry is in truth so purely experimental, that it can only be reached by direct facts. In giving this analysis, we have also been anxious to present as full an account as possible of the general subject, consistently with our limits, that our readers might be able to estimate at one view, what has been done and by whom. This too we conceived to be the most satisfactory mode of exhibit-

ing the additions which have been made to our knowledge by the investigations of Mr. Travers.

We cannot conclude however, without a decided declaration of our belief that the present volume must become a standard authority upon the subject to which it relates, not merely from the mass of information collected in it, but from the result which it displays of numerous and important original inquiries, and from the sound sense and discretion by which these have been guided. Our author has shown a degree of zeal and activity which obstacles have served only to heighten; and a directness and soundness in reasoning, which even *his* enthusiasm has not tended to mislead.

The writer of the work before us may by some be considered an unsparing and remorseless slayer of brutes. That such slaughter is always defensible we do not assert; and we admit that it can only be defended by clear and great good resulting from it. All must abhor cruelty proceeding from malice or caprice; all will readily allow that for the more perfect gratification of our appetites, we are not authorized in tormenting inferior animals; and it may with equal truth be declared that the design of procuring scientific amusement, is a motive no less inadequate to justify us in giving them pain. Whether the pleasure procured be that of the palate, as from roasting lobsters or crimping cod, or that of satisfied curiosity, as from viewing the pulsations of the heart or the absorption of chyle in living creatures, the object is alike selfish and alike unproductive.

It is not therefore the mere name of science that will sanction such acts; and though it is true that man, considered as a race, has always a selfish object even in useful experiments on living animals, an object to benefit the race which makes them with little if any regard to the service of that which endures them, yet if the advantage be great, we conceive that he has a strong plea in his justification. In knocking down an ox for food we are sanctioned by general practice; and when we inflict pain and death on dogs to avert pain and death from man, we act on a principle precisely similar, and may plead self-preservation in excuse. It is the urgency of the case which makes the defence; and, in fact, it must be allowed, that those who save

more suffering than they give, are benefactors to the cause of life. Each act however, must be measured by a strict and jealous rule, and by such our author must be judged. In balancing the account we believe that few extensive experimental enquirers will be found to have stopped precisely at that limit which bounds their utility.

ORIGINAL PAPERS.

Observations relative to the Application of a Ligature to the Subclavian Artery in cases of Wounds and Aneurisms.—Accompanied with two Plates.

BY JOSEPH PARRISH, M. D.

No branch of surgery requires more attention than the treatment of diseases and wounds of bloodvessels, for by the timely interposition of a judicious surgeon many lives may be preserved, which without such aid would most probably be lost.

Under these impressions, I shall proceed to offer some observations relative to the Subclavian Artery—the subject has engaged my attention for several months, and I have pursued the investigation in concert with my medical friends Drs. Thomas T. Hewson, and Joseph Hartshorne. We have repeatedly dissected the parts and taken up the artery on the dead subject; having examined for the purpose, fifteen bodies, exclusive of the one which I dissected for the purpose of having a drawing taken of the parts, as presented in one of the plates accompanying this paper; and it gives me pleasure to state, that all the observations upon this truly important subject, are to be considered entirely as the result of our joint labours.

In addition to this, Dr. Hartshorne and myself have, for a considerable time, been engaged in contriving an instrument, which experience has shown may be applied to the purpose of securing the Subclavian Artery, and may also be employed with great advantage in many other situations. A very ingenious and attentive surgeon's instrument maker (John Rorer of Phila-

delphia) has made the instrument for us; and a plate of it is affixed to this communication. A more particular account of this instrument and of the mode of using it, is reserved for another place: yet it will now be proper to state, that it consists of a needle, either blunt or sharp, having two eyes, one near the shoulder, the other near the point; and above the shoulder is a male screw; this may be adapted to a steel shank fixed in a small handle, and at the end of the shank there is a female screw. Needles of various sizes may all be adapted to one handle, as the screws correspond.

The attention of the reader is particularly requested to the plate of the Subclavian Artery, &c.; as it is principally intended to supersede an anatomical description, which it was concluded would be less likely to convey a just idea of the parts: yet it will be proper to make some general observations on the dissection.

The skin and platysma-myoides, together with the omo-hyoideus, were removed, also the principal part of the external jugular vein. A little dissection, and the removal of a small portion of cellular and adipose matter, brought the edge of the anterior scalenus muscle into view, and exposed the Subclavian Artery and vein, the axillary plexus of nerves, also the artery marked in the plate, superficial cervical branch, which it should be remembered is deeply situated, although the name might easily convey a different idea.

The sterno-mastoideus muscle was now detached by the scalpel from its insertion into the clavicle and sternum, and was turned aside. This fully exposed the internal jugular vein, and gave a distinct view of the point where the supra scapulary vein unites with the external jugular vein. They enter by a common trunk into the subclavian vein just before it joins the internal jugular.

The dissection was continued under and also below the clavicle. The supra scapular artery, which runs under this bone, was exposed, and the subclavius muscle was removed; also the pectoralis major and minor muscles: the bloodvessels and nerves in the axilla were dissected.

A portion of the clavicle was now removed with a saw. In consequence of this, the scapula, by falling off a little distance

from the trunk, widened the space and gave a more distinct view of the parts contained in the axilla; although it produced some change in their relative situation. But, as without this removal of the clavicle it would have been impracticable to have made the wished for demonstration in one plate, it was thought best to do it.

It will be seen, that the plexus of nerves above the clavicle are separated from the artery. Instead of this, in a natural state, one of the nerves lies nearly and sometimes quite in contact with the bloodvessel.

It must also be recollected, that the removal of the clavicle, by widening the space in the axilla, makes the artery appear much more accessible in that part than is really the case. The internal jugular vein is rather preternaturally distended by the injection.

The attention of the reader is particularly requested to the situation of the subclavian vein. When it arrives at the clavicle it generally passes along and under the bone, being below and in front of the artery; and the anterior scalenus muscle acts as a septum between these two important bloodvessels. I do not recollect but one instance in the course of our dissections where the subclavian vein was found rising above the clavicle. It was in a remarkably high shouldered subject, and the sternal portion of the bone was considerably depressed.

Several attempts have been made by surgeons to take up the Subclavian Artery. Few instances are to be found on record where it has been effected.

One is related by Thomas Ramsden, assistant surgeon to St. Bartholemews Hospital, who performed the operation. It may be found at the close of an octavo volume on Sclerocele, published by that gentleman in London, 1811, to which the reader is referred: the greater part of the case was republished in the Eclectic Repertory. I shall reserve some observations on the case, with an account of the operation, for another place.

In the Surgical Dictionary of Samuel Cooper, edited by J. S. Dorsey, M. D. page 72, under the article Aneurism, we find the following:—

"A wound of the axillary* artery, might render it neces-

* Winslow gives the name of axillary to the artery immediately as it has passed from behind the anterior scalenus muscle; we have, however, ventur-

sary to do this operation. This vessel was tied by a Mr. Hall, in Cheshire, when it had been wounded with a scythe, so as to bring the ends of the artery into view; and the arm was preserved, though it remained afterwards a little weak, which indeed, might be owing to some large nerve being divided. (See *Scarpa, p.* 372.) Mr. White, of Manchester, relates another instance of this vessel being tied, in the case of a wound; but, mortification of the limb, and death followed. Three of the nerves were found included in the ligature.—*London Medical Journal, Vol.* 4.

"In a case of axillary aneurism, which had actually burst, and the hemorrhage from which could only be stopped by pressing the artery against the first rib, Mr. Keate, the surgeon-general, practised the following operation, which was attended with completely successful consequences. This gentleman determined on taking up the artery, above the diseased and ruptured part, in its passage over the first rib. Accordingly, he made an incision obliquely downwards, divided the fibres of the pectoral muscle, that were in his way, and, when he came to the artery, passed a curved, blunt-pointed, silver needle, armed double, as he conceived, under the artery, and tied two of the ends. After a careful examination, finding that the artery pulsated below the ligature, he determined on passing another ligature higher up, and nearer to the clavicle: he, therefore, passed the needle more deeply, so as evidently to include the artery. In a few days the swelling of the arm began to subside, the wound suppurated, and the ligatures came away with the dressings. The arm afterwards recovered its feeling, and the patient regained, in a great measure, the entire motion of the shoulder, &c. *Med. Review and Magazine for* 1801."

In the case of axillary aneurism, which was successfully treated by the surgeon-general, it appears, that in the first attempt to pass the double ligature under the artery he thought he had succeeded, but, after careful examination, finding the artery pulsate below the ligature, he passed the *needle more deeply*, so as evidently to include the artery.

Now, when we recollect that the first ligature did not in-

ed to consider it as subclavian, following in this instance the authority of Haller, Bell, and most surgeons, who have written on this subject.

clude the artery, there is some reason to suppose that it embraced either the vein or some of the nerves; and at the second attempt, in which the needle was passed more deeply and included the artery, it probably took within its grasp some very important parts, although it is true the patient recovered. The bloodvessels and nerves are so blended below the clavicle that it appears as if it was almost impossible to discriminate between them.

The following abstract of a case of aneurism in the axillary artery is taken from the Clinique Chirurgicale, ou Memoires et Observations de Chirurgie Clinique. Par Ph. J. Pelletan. Tome II.

Gabriel Longpre, aged about forty years, was admitted into the hospital of the college of surgery, with an aneurism of the axillary artery of the right side.

The tumour filled the axilla, and projected forwards under the pectoralis major muscle. It pulsated with such force as to rise under the pressure of both hands.

This patient was received into the hospital more from a desire to study the nature of his disease than from any hope of effecting a cure.

By frequent examinations it was discovered, that the artery could be distinctly felt above the tumour, and that its pulsation could be entirely commanded by moderate pressure between the fingers.

The mode of operating proposed, was to make an incision through the integuments below the clavicle; then, introducing a director behind the pectoralis major, to divide all the fibres of that muscle which are attached to the clavicle.

An incision, made in this manner, would have denuded that portion of the axillary artery so easily grasped by the fingers; and a ligature might then have been passed under it with ease. On consulting the surgeons of the hospital respecting the propriety of performing this operation, one of them advised, that the pectoral muscle should not be divided; as there was some danger that the tumour would burst as soon as the support afforded by the muscle was removed.

It was determined that the muscle should not be divided,

and that some of its fibres should be included with the artery in a ligature.

After having made several unsuccessful attempts to plunge the needle through the muscle and under the artery, the operation was abandoned as impracticable.

The danger of the patient was not increased by this attempt: he died however twenty days afterward.

In contemplating the operation as attempted by the French surgeon, contrary, it appears, to his own judgment, it seems really surprising that the patient escaped from the hand of the operator as well as he did. A slight glance at the bloodvessels and nerves below the clavicle, as shewn in the plate, must be sufficient to convince any person of the extreme rashness of plunging a sharp pointed needle into such a situation; and further, that this should be done without first attempting at least, to cut through the pectoral muscle, in order to give the operator a slender chance of perceiving the danger, and, *if possible* of avoiding it, must be cause of astonishment to those who are familiar with the anatomy of the part. I shall leave any further remarks on the case with simply expressing my belief, that such practice must receive the marked disapprobation of every judicious surgeon.

An instance of an unsuccessful attempt to secure the Subclavian Artery, by that highly distinguished surgeon, Astley Cooper of London, was published in the Medical Repository of New York, by Valentine Mott, M. D., who assisted at the operation. Vide third Hexade, vol. i, page 331.

From the account of Doctor Mott it appears, that the patient was afflicted with Aneurism of the Subclavian Artery, which was very large, and had produced great alteration in the natural situation of the parts. The case was considered by Astley Cooper as very unfavourable for an operation; but the certainty of death, if no relief could be obtained, was so obvious, that the surgeon determined on giving the patient a chance; espeally as the poor man was willing to submit to any thing that might be thought proper for his relief, and the uncertainty of success was candidly stated to him.

By very careful dissection above the clavicle, the surgeon

proceeded in laying bare the axillary plexus of nerves, which lay so deep that the fore finger could but just reach them. The artery was felt feebly pulsating, and covered by one of the large nerves.

A *curved probe* was now passed under the artery, and repeated attempts were made to draw it from under the nerve, so as to pass a ligature round it; but these were all unsuccessful; and, after keeping the patient on the table one hour and fifty minutes, the operation was abandoned as impracticable, and the patient died on the sixth day.

Failure in the attainment of the object, occurring to Astley Cooper, can only be attributed to insuperable obstacles connected with the case. Yet it is possible, it was rendered still more embarrassing in consequence of the inadequacy of a curved probe to the purpose of passing a ligature under an artery so situated.

As it has been previously stated that the operation has been performed by Thomas Ramsden, I shall now insert his account of the mode of doing it:

"The patient being placed upon an operating table, with his head obliquely towards the light, and the affected arm supported by an assistant at an easy distance from the side, I made a transverse incision through the skin and platysma-myoides, along and upon the upper edge of the clavicle, of about two inches and a half in length, beginning it nearest to the shoulder, and terminating its inner extremity at about half an inch within the outward edge of the sterno-cleido-mastoideus muscle. This incision divided a small superficial artery, which was directly secured. The skin above the clavicle being then pinched up between my thumb and finger and those of an assistant, I divided it from within outwards and upwards in the line of the outward edge of the sterno-cleido-mastoideus muscle to the extent of two inches.

"My object in pinching up the skin for the second incision was to expose at once the superficial veins, and by dissecting them carefully from the cellular membrane to place them out of my way without wounding them. This provision proved to be very useful, for it rendered the flow of blood during the

operation very trifling comparatively with what might otherwise have been expected; and thereby enabled me with the greatest facility to bring into view those parts which were to direct me to the artery.

"My assistant having now lowered the shoulder* for the purpose of placing the first incision above the clavicle (which I had designedly made along and upon that bone), I continued the dissection with my scalpel until I had distinctly brought into sight the edge of the anterior scalenus muscle, immediately below the angle, which is formed by the traversing-belly of the omo-hyoideus and the edge of the sterno-cleido-mastoideus, and having placed my finger on the artery at the point where it presents itself between the scaleni, I found no difficulty in tracing it without touching any of the nerves to the lower edge of the upper rib, at which part I detached it with my finger nail for the purpose of applying the ligature.

"Here however arose an embarrassment, which (although I was not unprepared for it) greatly exceeded my expectation. I had learned, from repeatedly performing this operation many years since on the dead subject, that to pass the ligature under the subclavian artery with the needle commonly used in aneurisms would be impracticable; I had therefore provided myself with instruments of various forms and curvatures to meet the difficulty, each of which most readily conveyed the ligature underneath the artery, but would serve me no farther; for being made of solid materials and fixed into handles, they would not allow of their points being brought up again at the very short curvature which the narrowness of the space between the rib and the clavicle afforded, and which, in this particular case, was rendered of unusual depth by the previous elevation of the shoulder, by the tumor.

"After trying various means to overcome this difficulty, a probe of ductile metal was at length handed me, which I passed under the artery, and bringing up its point with a pair of small forceps, I succeeded in passing on the ligature, and then

* In my first incision I intentionally cut down along and upon the clavicle, as a security against wounding any superficial vessels; a very little lowering of the shoulder therefore placed the incision in the situation I wished to have it for the purpose of proceeding with the operation.

tied the subclavian artery at the part where I had previously detached it for that purpose. The drawing of the knot was unattended with pain, the wound was closed by the dry suture, and the patient was then returned to his bed."*

While reviewing the last description of this very important operation, I have been almost irresistibly led to compare the writer to a skilful navigator, who, after having safely conducted a vessel into a very dangerous port, has given an account of the adventure, with some cursory observations for the information of others; while he has omitted to lay down in his chart some very perilous shoals, which would, most probably; prove fatal to the inexperienced mariner. After indulging for a moment in this exercise of the imagination, I wish diffidently to offer some criticisms on the subject before us.

The practice of making the transverse incision directly upon the clavicle, and also of pinching up the skin in the second incision, for the purpose of avoiding the superficial veins, is obviously proper, and must receive the approbation of every surgeon, whose primary object is to proceed consistently with the welfare of the patient, without feeling anxious to display a very unusual dexterity in the use of the knife.

At this stage of the operation, the shoulder was lowered by the assistant for the purpose of placing the first incision above the clavicle. The dissection was then continued until the edge of the anterior scalenus muscle was distinctly brought into view; and the artery was exposed, and traced with the finger

* For the purpose of drawing the ligature firmly upon the artery, T. Ramsden recommends two instruments, marked in one of his plates NN, to which the reader is referred. He states that they proved particularly serviceable in a part of the operation, where the fingers alone would have been inadequate without pulling away the artery from its attachments to a great extent.

They appear to be formed of two pieces of metal; each piece is terminated at one end in a ring of sufficient size to allow a ligature to pass freely through it—probably firm iron wire fixed in a handle would answer the purpose.

The ends of the ligature are to be passed through the rings; the operator may then gently pass the instrument down to the artery, then twisting the ligature round the instrument so as to prevent it from slipping, he firmly ties the knot.

Every surgeon who attempts the operation ought to be provided with these instruments, although it may not be necessary to use them in all cases.

to the *lower edge* of the upper rib, at which point it was secured by a ligature.

Now, when I recollect the frequent dissections made in concert with my two medical friends, I can scarcely refrain from expressing my surprise, that, really the most important difficulties likely to occur in the course of the operation, should be entirely omitted.

Upon examination of the parts, as exhibited in the plate, it will appear, that very important bloodvessels are involved in this part of the operation. The superficial cervical branch is an artery equal in size to the radial; the supra scapular artery is very little inferior in size; even the supra scapular vein would, if wounded, cause great embarrassment in the operation.

None of these vessels are even noticed; and yet all of them are unquestionably in great danger of being wounded, if, by dissection with the scalpel, the edge of the anterior scalenus muscle is brought distinctly into view.

When we advert to the extreme difficulty of securing either of these arteries, especially the superficial cervical, which is deeply situated in a part where we can have no controul over the circulation, it is really remarkable, that in a description of the operation they should not have obtained the most marked attention.

Again, the ligature was passed round the artery at the *lower edge* of the first rib. Now, I trust we shall make it appear that the *upper edge* of the first rib ought to be preferred.

Before leaving the consideration of this valuable case I wish again to request the reader to consult it at large. The observations of the writer are certainly very interesting, and his remarks on the inutility of the practice hitherto generally adopted, of deferring the operation for aneurism as long as possible, in order to allow time for the anastomosing vessels to enlarge, appear to be worthy the serious attention of every practical surgeon.

I shall now proceed to describe the mode of performing the operation, conformably to the views we have taken of the subject.

OPERATION.

After having completed the two external incisions, in the manner recommended by T. Ramsden, it is of great importance to attend to the position of the shoulder and arm. The former should be depressed as far as practicable by an assistant, who should at the same time keep the arm close to the body. The increase of space above the clavicle, produced by this movement, can scarcely be fairly appreciated by any but those who have dissected the parts, and tried the experiment for themselves.

The operator ought now to be deeply impressed with the knowledge of the fact, that the greatest degree of danger still awaits him. He should be aware of the bloodvessels which lie in the way; and that he has now only to pass through cellular and adipose matter in getting down to the fascia which covers the artery. If the handle of his scalpel and his fingers should be found inadequate to his purpose, then it is recommended that he should use a knife as narrow as the one commonly employed in the division of the cornea, with its cutting edge confined entirely to the extremity of the blade, which should be of a rounded form; in this manner he may cautiously dissect into a deep and narrow cavity without incurring the same risk of wounding the bloodvessels as would be the case if a common scalpel were employed. But instead of pursuing his dissection with a scalpel, of any description, let him now use this instrument *as little as possible;* remembering that it is not essential to his purpose to bring the edge of the anterior scalenus muscle into view: he has another and a more certain guide to conduct him to the precise point for securing the artery. To fix this point was to us a subject of considerable importance, that required and received very deliberate attention: and we are decided in our preference for the *superior edge* of the first rib. Here, as has been previously stated, the artery is situated further from the subclavian vein than in any other part, and is also as distinct from the plexus of nerves. In addition to this, the operator has a guide to conduct him precisely to the part

he is seeking for, which we believe has never been noticed by any preceding surgeon; just at the insertion of the anterior scalenus muscle into the upper edge of the first rib, there is a roughness or rather process on the bone which is very perceptible to the touch: in the generality of subjects it is so clearly defined that it cannot be mistaken. Now, instead of the operator depending on his vision to manifest the edge of the anterior scalenus muscle, he may get at the exact spot he is in pursuit of, by a reliance on the sense of touch. At this part then let the operator gently detach the artery from its surrounding connections, and then a very important object remains to be accomplished, viz. passing a ligature under the bloodvessel.

This was the part of the operation that Astley Cooper, with the instrument he used, found it impracticable to accomplish. Great difficulty was experienced by T. Ramsden, although he ultimately succeeded with a probe of ductile metal.

After very frequent trials, on the dead subject, of the instrument proposed, by Dr. Hartshorne and myself, we can recommend it as well calculated to conduct a ligature under the Subclavian Artery; and by referring to the anatomical situation of the parts, it must be obvious that a small sized blunt needle, as shewn in the plate, is most proper.

After the needle is adapted to the handle and armed with a ligature, let the operator pass the fore finger of his left hand down on the outer side of the artery and feel for the roughness or process on the superior edge of the first rib; then, with the right hand, carefully introduce the needle between the artery and vein, with its back or convex part towards the vein, and push it under the artery in a direction obliquely outward and backward. After this has been accomplished, he may easily keep the needle steady with the thumb and finger of his left hand, while, with the right hand, he quickly unscrews the handle. There is now a needle and ligature under the artery; and if it be found difficult with the thumb and fore finger to complete their passage under the bloodvessel, then the hook, marked as such in the plate, can be readily passed down into the cavity and fixed in the eye of the needle near the point. The needle and ligature may now be drawn up, and the artery tied.

The direction for passing the needle obliquely outward and backward is believed to be of considerable importance; as, by referring to the anatomical situation of the parts it will be perceived, that by pushing even a blunt needle in an opposite direction, especially in a restless patient, there would be some danger of wounding the thin coats of the subclavian vein; and even if the coats of the vein were not immediately perforated, yet it might be so injured as to inflame and slough.

The double needle is believed by Dr. Hartshorne and myself to be capable of very extensive application. The largest, or even the second sized blunt needle will be found well adapted to the purpose of conducting a ligature under the external iliac artery; while those which are pointed are specially intended for wounded arteries that are difficult of access. Thus, for example, the smallest size may be employed for the anterior tibial artery, and the second, or even the largest, may be kept in reserve during the operation for lithotomy, in case of the pudic artery being cut. By passing the needle close to the crus of the pubis and ischium from within outward the artery may in this manner, be included in a ligature.

It may be offered as an objection to this instrument, that the screw will cause embarrassment to the operator. In reply to this it may be said, that we believe experience will prove that this is not the case.

Again. The screw is liable to become oxided. This objection requires attention, and to obviate it, the instrument should be occasionally examined and touched with oil. I have tried silver for the blunt needle, but it is not sufficiently firm.

I was informed by Joseph Cloud, a distinguished chemist in the mint of the United States, that, according to his experiments, gold and platina may be so combined as to form a metallic body sufficiently firm for the purpose of a screw; and, at a small expense a button of this could be adapted to the end of a steel shank and the female screw cut in it, which could effectually secure this part of the instrument from oxidation; or, the whole shank may be made of this metallic combination. The needle, if necessary, may be gilt with the etherized gold.

These circumstances are mentioned merely to guard against difficulties that may be suggested; as it is believed that common

steel, properly managed, will be found quite adequate to the purpose.

We have also thought of having the needle so formed as to fit into the shank without a screw; and instead of it, to have it secured by a spring: but, as this spring must be fixed in the handle, it would be liable to be touched during an operation, and the needle would be detached before the right time. This, it is true, might be obviated, by having the spring imbedded in the handle, and then covered by a clasp, which must be first opened before the spring could be touched: but it is believed that the complexity of such an instrument, and its liability to be put out of repair, would more than counterbalance any advantage which might arise from its use.

It is of importance that the portion of metal connected with the shank should extend through the handle, that it may be riveted in several places, and thus give the requisite firmness to the instrument.

The operation for securing the Subclavian Artery is at all times attended with great danger, and no surgeon should ever attempt it, who has not, by frequent dissection, made himself familiar with the anatomy of the part.

EXPLANATION OF THE PLATES.

A. The Humeral Portion of the Clavicle.
B. Sternal Portion of the Clavicle.
C. Sterno-cleido-mastoid Muscle turned aside.
D. Anterior Scalenus Muscle.
E. Arteria Innominata.
F. Commencement of the Subclavian Artery.
G. Carotid Artery.
H. Internal Jugular Vein.
I. Common trunk of the external Jugular Vein, and the Supra-scapular Vein.
K. Superficial Cervical Artery.
L. Subclavian Artery.
M. Supra-scapular Artery.
N. Axillary Plexus of Nerves.
O. Axillary Artery.
P. Subclavian Vein.
Q. Second Scalenus Muscle.
R. Axillary Vein.
S. Cephalic Vein.
T. Basilic Vein.

A. The handle and shank of the instrument, having a female screw at the extremity.
b, c, d, e, f. Sharp and blunt needles, each of which has two eyes.
G. One of the needles adapted to the shank.
H. A hook to be used in raising the needle when the vessel lies so deep that it cannot easily be reached by the fingers: the hook to be introduced into the eye near the point of the needle, after it has been passed under the artery.

Biographical Account of Dr. Pitcairn.

[From the London New Medical and Physical Journal for August 1811.]

DAVID PITCAIRN, M. D. F. R. S. F. A. S. Fellow of the College of Physicians of London, and Physician Extraordinary to the Prince of Wales, was the eldest son of the gallant Major John Pitcairn, of the marines, who was killed in the

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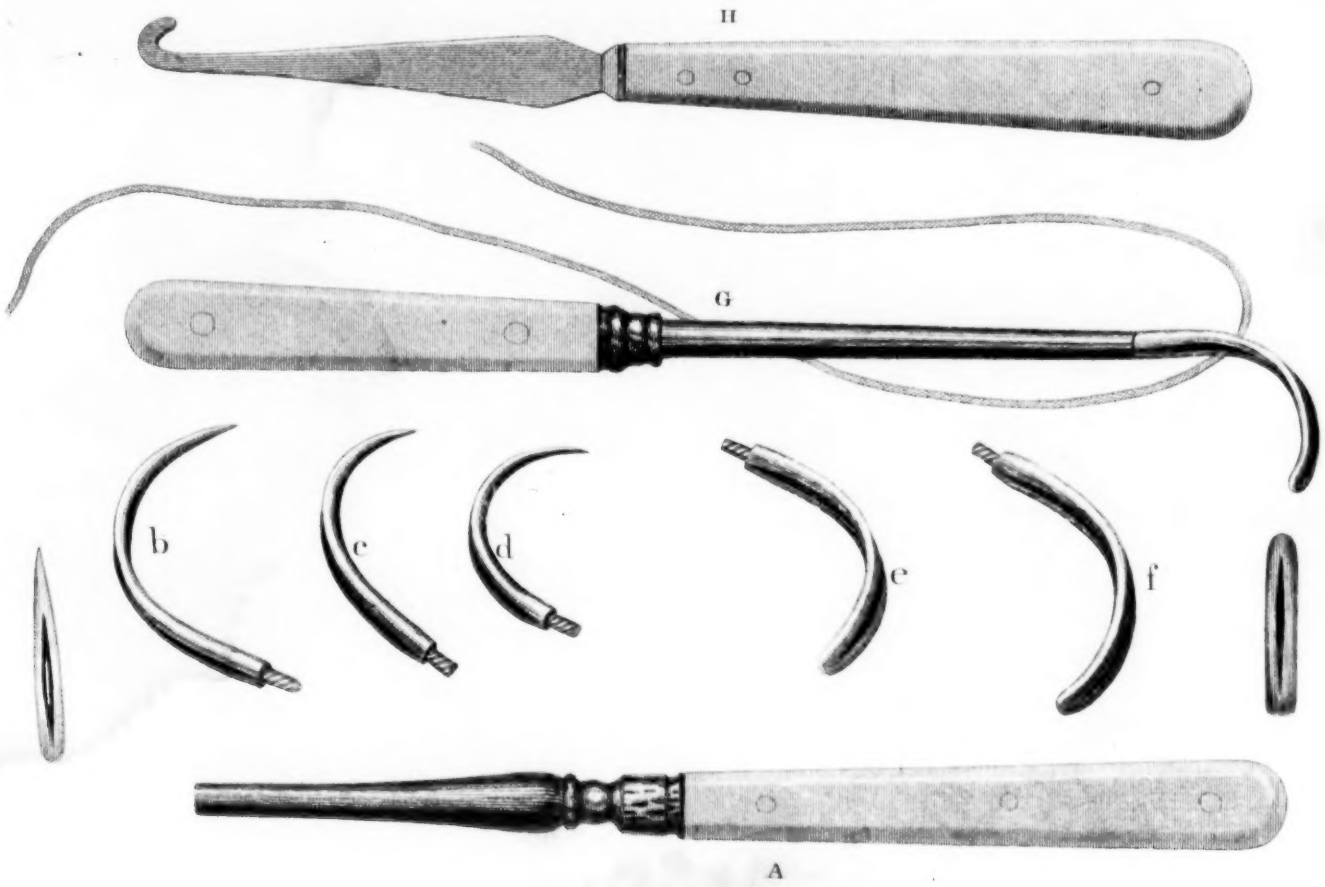
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attack upon Bunker's Hill, in June 1775, and Elizabeth, the daughter of Robert Dalrymple, Esq. of Annefield, in the county of Dumfries. His paternal family was one of the most ancient in Fifeshire, deriving its name from a landed possession called Pitcairn.

Dr. David Pitcairn was born on the 1st of May, 1749, in the house of his grandfather, the Rev. David Pitcairn, minister of Dysart, in the county of Fife. When about nine or ten years old, he was sent to the high school at Edinburgh, where he remained four years; after which he went to the university of Glasgow, and prosecuted his studies there till he arrived at the age of twenty. At this period of his life he used to spend much of his leisure time with the family of the Rev. James Baillie, minister of Bothwell, in the county of Lanark, and father of the celebrated dramatic writer, Miss Johanna Baillie. During this intercourse commenced an affectionate intimacy between Dr. Pitcairn and Dr. Baillie, which afterwards, as the difference of their years became less in proportion to their ages, gradually changed into the warmest friendship, that continued ever afterwards. It being now determined that he should be a physician, he went, in 1769, to the university of Edinburgh, and studied medicine there for three years, under the immediate direction of the illustrious Cullen. In 1772 he came to London, and attended the lectures of his uncle's learned friends, Dr. W. Hunter and Dr. G. Fordyce. About the same time also, that he might attain an English degree in physic, though he was then nearly twenty-three years old, he entered at Bennet College, Cambridge. In 1780, several years before he received his Doctor's degree, he was elected physician to St. Bartholomew's hospital; and about the same time may be placed the commencement of his private medical practice. In 1792 he was chosen physician to Christ's hospital; and in the following year, his private practice being now considerable, he resigned the office of physician to St. Bartholomew's hospital. His office at Christ's hospital demanded but little of his time, and was therefore retained by him several years longer.

By the death of Dr. Warren, which took place in June 1797, Dr. Pitcairn was placed at the head of his profession in London. One or two other physicians possibly derived as much pecuniary emolument from the practice of medicine as him-

self; but certainly no other was so frequently requested by his brethren to afford his aid in cases of difficulty. But this prosperous state did not endure long. In the autumn of the same year, he fell from his horse and bruised his side. Shortly after, his heart began to beat with violence, and his attention was more particularly directed to this symptom, as it had occurred in one of his brothers likewise in consequence of a fall, whose heart after death was found considerably enlarged. He continued, however, to follow his profession till February in the following year, when he was attacked with a hæmorrhage from his lungs. From this he recovered, after some time, so far as to be enabled to resume the exercise of his profession; but the same disease having recurred in summer, he embarked in September for Lisbon. During a stay of more than eighteen months in Portugal, he had no return of the hæmorrhage, in consequence of which he ventured to come back to his country in May, 1800. He was still feeble; and his heart was beating too forcibly; he for some time, therefore, declined altogether engaging in medical practice. Afterwards, as his own health improved, he began to receive patients at his house; then to meet other physicians in consultation at the houses of their patients; and at length, after an interval of several years, to undertake the entire care of sick persons at their own homes, except during four months of the latter part of the year, which he spent almost wholly in the country. In the mean time, however, the palpitation of his heart continued; on which account he for a long time lived very abstemiously, drinking only water, and abstaining almost entirely from animal food. But, as the beating did not increase, and no other sign of a diseased heart existed, and as he found a vegetable diet to produce in him much flatulence, about a year or two before his death he began to eat moderately of animal food once a day, and to take sometimes after dinner a single glass of wine diluted with water.

Under this change of regimen his appearance altered considerably, and, during the last six months of his life, he frequently received the congratulation of his friends on the improvement which his health had undergone. Disregarding the advice given by one of the masters of our art, "*si plenior aliquis, et coloratior, factus est, suspecta habere bona sua debet*," he seemed to look upon his increased strength as a permanent

acquisition, and as chiefly valuable from enabling him to bear an increase of professional labour. In the course of the month of March, for instance, he rose several times from his bed soon after midnight, and travelled between twenty and thirty miles before morning, to visit a patient. From these exertions, however, he appeared to suffer no immediate injury. But about the beginning of April, he found that he was heated by his single glass of wine, though diluted largely with water, and therefore discontinued it.

On the 13th he felt a soreness in his throat, but thought so lightly of it, that he continued his professional visits during that and the two following days. In the night of the 15th, his throat became worse, in consequence of which he was copiously bled, at his own desire, and had a large blister applied over his throat; but the irritation occasioned by the latter remedy was so distressing to him, that it was removed before its intended effect was fully produced.

On the evening of the 16th, Dr. Baillie called upon him, without knowing that he was ill; and having heard the history of his ailment, and an account of the remedies employed, he entirely approved of what had been done. At this time Dr. Baillie observed no symptom which indicated danger. The disease becoming more violent in the course of the night, a considerable number of leeches were applied to the throat early in the morning. Dr. Baillie visited him at eleven o'clock in the forenoon. His countenance was now sunk, his pulse feeble and unequal, his breathing laborious, and his voice almost lost, from the swollen state of the parts concerned in its formation. In this state he wrote upon a piece of paper, that he conceived his windpipe to be the principal seat of the disease, and that this was the croup. Mr. Home was also present; and it was agreed that an attempt should be made to give relief by wounding the tonsils. This was accordingly done; some blood issued, but nothing purulent. Both the patient, however, and those about him, conceived that he had derived benefit from the operation. Dr. Baillie saw him again between four and five in the afternoon, and thought his situation much improved; for the pulse was now equal and more firm, and his general appearance indicated less debility and distress. Under this persuasion he left him, having previously agreed to return at ten in the

evening, when he was to meet in consultation Mr. Home and another physician, who had long been intimate with his patient. A little before Dr. Baillie had paid the visit just mentioned, a slight drowsiness had come on, and this symptom rather increased after his departure. But nothing more remarkable occurred till near eight o'clock, when the patient's breathing became suddenly more difficult. About 20 minutes after this he died.

The body was examined the second day after death by Mr. Home, Dr. Baillie, and Dr. Wells. The throat and tongue were found much inflamed and swollen. The inner membrane of the trachea was also found inflamed, but altogether free from that preternatural coating which occurs in croup. The heart and lungs were entirely sound; but the aorta, close to its origin, was somewhat diseased; sufficiently, perhaps, to occasion in a person of an irritable frame, an increased force in the pulsations of the heart, though apparently not in such a degree as to affect the duration of life. On the 25th his corpse was deposited in a vault in the church of St. Bartholomew, near Smithfield, which contained the remains of his father and uncle.

In 1781, he married Elizabeth, the only daughter of William Almack, Esq. of London, and a niece of his preceptor, Dr. Cullen; but had no issue.

His person was tall and erect, but of late years rather thin; his countenance during youth was a model of manly beauty, and even in advanced life was remarkably handsome. His memory was strong, and his judgment sound; whatever, therefore, he learned, was retained and well assorted; so that in time he excelled most of those who had once been regarded his superiors. His knowledge of history and geography, from the strength of his memory, was particularly accurate.

Few persons ever gained, without any direct effort to this end, so extensive an acquaintance with the various orders of society. His education began at the largest school in Great Britain. He afterwards studied for several years at each of the great Universities of Glasgow, Edinburgh, and Cambridge, and attended the principal lectures on medicine in London. While a young man in London he lived with his uncle, who had many friends, and frequently entertained them at his house. He resided many years in Lincoln's Inn Fields; and, while

there, associated daily with gentlemen of the law. He was early admitted a Fellow of the Royal and Antiquarian Societies, and hence knew many learned men, in addition to those of his own profession. He was fond of country sports and athletic games, particularly the Scottish one named golf which carried him among other sets of men. He had a taste also for the fine arts, in consequence of which he became acquainted with many of the professors of them; and his employment as a physician in the largest hospital in the kingdom, as well as in private practice, made known to him a very great number of persons of every rank and description in life. From such opportunities, possessing an original turn for the observations of character, he obtained a most extensive knowledge of human nature, and an infinite fund of stories and anecdotes, which, when at ease among his friends, he used to relate in the happiest way. In conversation he shunned disputes. When he dissented from others, he either declared his opinion in few words, or remained altogether silent. With literary men his value as a companion was considerably increased by his judgment in selecting, and lively mode of repeating, passages from new works of taste, most of which he read immediately after they were published. But, though he had lived so much in society, he never entirely lost a natural shyness of manner, which was more observable at sometimes than at others. This was often imputed, by those who did not know him, to pride; though, in truth, it seemed to arise from a diffidence of his own merit. As he advanced in years his manners became less reserved to strangers; for, to his friends, they had always been frank and affectionate.

His feelings were warm, and he was sometimes betrayed by them into little improprieties; but this disadvantage was greatly outweighed by the energy which was hence given to his character, and the interest which he hence took in the happiness of others. It may be regarded, perhaps, as no inconsiderable title to praise, that he behaved with the utmost kindness and generosity towards his numerous relations. But his endeavours to serve were not confined to these. He was ever ready to assist his friends in their pursuits, not only by his advice, but by his influence with others, and the sacrifice of his time; to say nothing of other aids which he frequently furnish-

ed. Like other men of warm tempers, he was apt to bestow upon his present pursuits more than their due importance; and, as increase of years and professional employment, together with great varieties in the state of his health, necessarily produced alterations in his views of life, he was hence thought by some to be of a changeable disposition, but this was never said respecting his attachment to persons. He continued to the last, loving his first friends, and he was, in return, most cordially beloved by them.

His manner, as a physician, was simple, gentle, and dignified, and always sufficiently cheerful to encourage hope, without offending by its incongruity with the scene about him. From his kindness of heart, he was frequently led to give more attention to his patients than could well be demanded from a physician; and as this evidently sprung from no interested motives, he often acquired considerable influence with those whom he had attended during sickness. No physician, indeed, of his rank in London, perhaps, ever exercised his profession to such a degree gratuitously. His behaviour to other physicians was highly candid and liberal, and he most studiously avoided the slightest appearance of interfering in their professional concerns. Such conduct is, no doubt, recommended by its ultimate utility; but in him it arose from a native sense of honour that appeared in every other transaction of his life.

As he attended very carefully to the symptoms of diseases, in the order and degree in which they occur in nature, he had, from this source, and the excellence of his memory, acquired great practical knowledge of his profession. He had, in consequence, also made many original observations upon the history and treatment of diseases. He was, for instance, the first who took notice of the connection between rheumatism of the external parts of the body, and a certain affection of the heart, which he hence called rheumatism of that organ. Since it was mentioned by him, numerous examples of it have been seen by others, which puts the justness of the observation beyond doubt, though no trace of it exists in any author prior to Dr. Baillie, to whom he had communicated it. He never published any of his observations himself: but several, besides that which has just been spoken of, have been given to the world by others.

MEDICAL AND PHILOSOPHICAL INTELLIGENCE.

The National Vaccine Establishment.

[From the Monthly Magazine, for October, 1812.]

THE following satisfactory Report to the Secretary of State, was lately made by Drs. Millner and Hervey, relative to the progress and success of the Vaccine Inoculation.

The Board of the National Vaccine Establishment have the honour of reporting that, during the year 1811, the surgeons appointed by their authority to the nine stations in London, have vaccinated 3,148 persons, and have distributed 23,794 charges of vaccine lymph to the public. The number vaccinated this year rather exceeds that of the year 1810, and the demand for lymph has been often so great that it could not be immediately supplied.

They have great satisfaction in stating, that, since the commencement of this establishment, not a single instance of the accession of small-pox, after vaccination, has occurred to any of the vaccinating surgeons of the nine stations.

The Board report, that they have been lately furnished with many satisfactory official documents from the naval and military departments of government, respecting the progress of vaccination, and have likewise obtained some other authentic papers on the subject, containing much important information. They think it expedient to lay before you a summary of their contents.

It appears, that, in consequence of an order from the Lords Commissioners of the Admiralty, vaccination has been practised in the navy to a great extent; and, although it has not been universally adopted, the mortality from the small-pox, among seamen, is already greatly diminished.

In the army, the practice of vaccination has been long established, by an order from the Commander in Chief, and its effects have been decidedly beneficial; for almost the only persons among the troops who have lately been affected with small-pox, have been either recruits, who had received the infection previous to their enlistment, or soldiers who had not

been vaccinated, on the supposition of their having had the variolous disease. Thus, with a few exceptions, a disorder formerly so fatal to the troops, is now considered as nearly extinguished in the army.

By information transmitted to the Board from their numerous correspondents in all parts of the country, it appears, that vaccination is almost every where gaining ground, throughout the British dominions, though its progress is very different in different places; and it is found, that the number of deaths from the small-pox is uniformly decreasing, in proportion as vaccination becomes more general, and the inoculation of the small-pox declines.

The disappearance of the small-pox from the island of Ceylon, was noticed in the Report of last year; and the Board has now the pleasure of stating, from sources of authentic and satisfactory information, that, in consequence of vaccination, this dreadful disease has in no instance lately occurred in the island of Anglesey, in the populous city of Newcastle-upon-Tyne, in the town of Petworth, or in the adjoining district.

Through the different counties of England, the practice of vaccination is becoming general, and the small-pox is gradually declining; and even in London, where the opposition to the new inoculation has been most violent, it is prevailing, and its salutary effects are becoming daily more evident. At present, by the best estimate we are able to make, it appears that nearly two-thirds of the children annually born in the metropolis, are vaccinated either by charitable institutions or private practitioners; and that the number of deaths by small-pox has proportionally decreased. Previous to the discovery of vaccination, the average number of deaths by small-pox within the bills of mortality, was 2,000 annually; whereas, in the last year, only 751 persons have died of that disease, although the increase of population within the last ten years has been 133,139. The increase of population throughout Great Britain, in the same period of time, has been 1,609,000; and to these augmentations the practice of vaccination has probably much contributed.

The Reports from the Cow-pock Institution in Dublin, are of the most favourable nature, and furnish sufficient reason to

believe, that, since the introduction of the vaccine preventive, the mortality from small-pox has considerably declined in that city. The correspondence of the Institution affords satisfactory evidence of the progressive increase of vaccination throughout Ireland. In most of the principal towns of that kingdom, the poor have the advantage of gratuitous inoculation with cow-pox, either at the hospitals, or at the houses of the physicians; and it is stated, that, among the higher ranks, vaccination is universally adopted.

The accounts from Scotland, particularly those from the faculty at Glasgow, which have been transmitted to the Board, furnish evidence of the general and rapid increase of vaccination in the northern part of the island, and give the most satisfactory proofs of the success and efficacy of the practice.

Notwithstanding the incontrovertible evidence of the very great advantages of vaccination, it is much to be lamented that there are still some medical practitioners, though the number of them is comparatively small, who obstinately persist in disseminating by inoculation the contagion of the small-pox, and who strenuously encourage and support, especially among the lower orders of the people, the prejudices against the new practice; rumors are industriously spread abroad, of deforming and loathsome diseases produced by this practice; and numerous mis-statements of cases are published, of the occurrence of small-pox after vaccination. That, in some instances, the small-pox has affected persons who have been most carefully vaccinated, is sufficiently established; nor ought we to be surprised at this, when we consider that the inoculation for the small-pox sometimes fails, and that several cases may be produced, in which persons have been affected with the natural disease more than once in the course of life. The number of instances of small-pox after vaccination, however, is very small; and we may fairly presume, that in proportion as improvements are made in the practice, such occurrences will be still more rare.

The Board have infinite satisfaction in stating the two following important and decisive facts in proof of the efficacy and safety of vaccination, viz. that, in the cases which have come to their knowledge, the small-pox, after vaccination, with a

very few exceptions, has been a mild disease; and that, out of the many hundred thousand persons vaccinated, not a single well-authenticated instance has been communicated to them, of the occurrence of a fatal small-pox after vaccination.

They cannot conclude their Report, without adverting to the mischiefs which are daily arising from the diffusion of the fatal contagion of small-pox in the community, in consequence of variolous inoculation, among the lower classes of the people, which constantly keeps up the contagion, and, where it saves a single life, exposes numbers to a most dangerous disease. It is greatly to be wished that this evil could be checked, by such measures as government in its wisdom might judge proper to frame, in order to prevent the spreading of the small-pox, and thus keeping up a continual source of infection in the heart of the metropolis.

Part I. of the Philosophical Transactions of the Royal Society for 1812 has just made its appearance. The following are its contents:

1. On the grounds of the Method which Laplace has given in the second Chapter of the third Book of his Mécanique Céleste for computing the Attractions of Spheroids of every Description. By James Ivory, A. M. Communicated by Henry Brougham, Esq., F.R.S. M.P.—2. On the Attractions of an extensive Class of Spheroids. By J. Ivory, A.M. Communicated by Henry Brougham, Esq. F.R.S. M.P.—3. An Account of some Peculiarities in the Structure of the Organ of Hearing in the Balæna Mysticetus of Linnæus. By Everard Home, Esq., F.R.S.—4. Chemical Researches on the Blood, and some other Animal Fluids. By William Thomas Brande, Esq., F.R.S. Communicated to the Society for the Improvement of Animal Chemistry, and by them to the Royal Society.—5. Observations of a Comet, with Remarks on the Construction of its different Parts. By William Herschel, LL.D. F.R.S.—6. On a gaseous Compound of carbonic Oxide and Chlorine. By John Davy, Esq. Communicated by Sir Humphrey Davy, Knt., LL.D., Sec. R.S.—7. A Narrative of the

Eruption of a Volcano in the Sea off the Island of St. Michael. By S. Tillard, Esq., Captain in the Royal Navy. Communicated by the Right Hon. Sir Joseph Banks, Bart. K.B.P.R.S. —8. On the primitive Crystals of Carbonate of Lime, Bitter-Spar, and Iron-Spar. By William Hyde Wollaston, M.D. Sec. R.S.—9. Observations intended to show that the progressive Motion of Snakes is partly performed by means of the Ribs. By Everard Home, Esq. F.R.S.—10. An account of some Experiments on the Combinations of different Metals and Chlorine, &c. By John Davy, Esq. Communicated by Sir Humphrey Davy, Knt. LL.D. Sec. R.S.—11. Further Experiments and Observations on the Action of Poisons on the Animal System. By B. C. Brodie, Esq. F.R.S. Communicated to the Society for the Improvement of Animal Chemistry, and by them to the Royal Society.

It is a curious fact, observe the Editors of the Monthly Magazine, that the schedule to the new Medicine Act contains the names and titles of between *five and six hundred Quack Medicines!* The principal object of the bill was, however, to render liable to the *stamp duty* and *revenue laws*, "all "artificial mineral waters, and all waters impregnated with "soda, mineral alkali, or carbonic acid gas."

Monthly Mag. October 1812.

Mr. Brodie has read a paper on Animal Heat to the Royal Society, tending to confirm some of his remarks on this subject in his former communications. He animadverted on the inadequacy of Black's Theory, and the inaccuracy of Crawford's Experiments; showed that by artificial respiration, animal bodies deprived of the brain cool faster than when left alone, although an equal portion of oxygen is absorbed, and carbon disengaged in the process, as when the animal was living; and he hence inferred, that the action of the brain and nerves is necessary to the production of animal heat.

Monthly Mag. October 1812.

Statement of the situation and occurrence of Hernia at different periods of Life. By John Taunton, Esq.

The following statement of the situation and occurrence of Hernia at different periods of life, has been obtained principally from patients relieved by the City of London Truss Society, by John Taunton, Esq. Surgeon to the Society, within the short period of four years and a half.

In 3,176 patients, 2,702 were males, and 474 were females. The situation of the hernia in each case will be seen in the following table:

704	Left inguinal	1,910 inguinal	2,194 Single.	
1,206	Right inguinal			
154	Left femoral	284 femoral		
130	Right femoral			
728	Double inguinal	.....		792 Double.
64	Double femoral			
172	Umbilical	.....		190
18	Ventral			
3,176				3,176

202 Patients were relieved with trusses, under 10 years of age.
160 Ditto between 10 and 20 ditto.
310 Ditto ..... 20 and 30 ditto.
596 Ditto ..... 30 and 40 ditto.
632 Ditto ..... 40 and 50 ditto.
664 Ditto ..... 50 and 60 ditto.
432 Ditto ..... 60 and 70 ditto.
168 Ditto ..... 70 and 80 ditto.
10 Ditto ..... 80 and 90 ditto.
2 Ditto ..... 90 and 100 ditto.

3,176

From the most accurate estimation which he has been enabled to make, he has no doubt of this malady existing in one person in eight throughout the whole male population of Great Britain, and even in a much greater proportion among the labouring classes of the community, in manufacturing districts, particularly in those persons who are employed in weaving.

Tilloch's Philos. Mag. June 1812.

Dr. Bateman has been engaged for some time past, in preparing for publication, a short treatise on the Diseases of the Skin, according to the lucid arrangement devised by the late Dr. Willan, which is calculated to teach accuracy in the discrimination of the appearances of eruptive disorders, and to render the language in this department of medicine clear and definite. From a long connection with the same public institution with Dr. Willan, and from direct personal communication on these topics, Dr. Bateman will be enabled to include in his Synopsis, a view of the unfinished parts of the classification, as well as of those already before the public.

Monthly Mag. August 1812.

From Mr. Montagu's researches on the Constitution of Sponges, it appears, that no polype, or vermes of any kind are to be discerned in their cells or pores; they are, however, decidedly of an animal nature, and possess vitality without perceptible action or motion! Mr. Montagu has divided the genus Spongia, into five families, viz. branched, digitated, tubular, compact, or orbicular. Only fourteen species were previously known, but Mr. Montagu has described no fewer than thirty-nine. *Ibid.*

An account of the Life and Discoveries of the celebrated Cavendish, has been lately read by Chaptal at a sitting of the National Institute of France.

Monthly Mag. October 1812.

ROYAL SOCIETY.

Mr. Brodie has extended his experiments on poisons to those of the mineral kingdom, and his valuable paper was read to the Royal Society on the 27th of February last.

Since (says he) I had the honour of communicating to the Royal Society some observations on the action of certain poisons on the animal system, I have been engaged in the further prosecution of this inquiry. Besides some additional experiments on vegatable poisons, I have instituted several with a view to explain the effects of some of the more powerful poisons of the mineral kingdom. The former correspond in their

results so nearly with those which are already before the public, that, in the present communication, I shall confine myself to those which appear to me to be of some importance, as they more particularly confirm my former conclusions respecting the recovery of animals apparently dead, where *the cause of death operates exclusively on the nervous system.* In my experiments on mineral poisons, I have found some circumstances wherein their effects differ from those of vegetable poisons, and of these I shall give a more particular account.

Experiments with the Woorara.—In a former experiment, I succeeded in recovering an animal, which was apparently dead, from the influence of the essential oil of bitter almonds, by continuing respiration artificially until the impression of the poison upon the brain had ceased; but a similar experiment on an animal under the influence of the woorara was not attended with the same success.

On the Effects of Arsenic.—When an animal is killed by arsenic taken internally, the stomach is found bearing marks of inflammation; it is a very general opinion,—1, that this inflammation is the cause of death: 2, that it is the consequence of the actual contact of the arsenic with the internal coat of the stomach. But in several cases I have found the inflammation of the stomach so slight, that on a superficial examination it might have been easily overlooked; and in most of my experiments with this poison, death has taken place in too short a time for it to be considered as the result of inflammation: and hence we may conclude, that the first of these opinions is incorrect; at least as a general proposition.

Many circumstances conspire to show that the second of these opinions also is unfounded.

In whatever way the poison is administered, the inflammation is confined to the stomach and intestines; I have never seen any appearance of it in the pharynx or œsophagus.

The symptoms produced by arsenic may be referred to the influence of the poison on the nervous system, the heart, and the alimentary canal. As of these the two former only are concerned in those functions, which are directly necessary to life, and as the alimentary canal is often affected only in a slight degree,

we must consider the affection of the heart and nervous system as being the immediate cause of death.

In every experiment which I have made with arsenic, there were evident marks of the influence of the poison on all the organs which have been mentioned; but they were not in all cases affected in the same relative degree. In the dog, the affection of the heart appeared to predominate over that of the brain, and on examining the thorax, immediately after death, this organ was found to have ceased acting and in a distended state. In the rabbit, the affection of the brain appeared to predominate over that of the heart, and the latter was usually found acting slowly and feebly, after the functions of the brain had entirely ceased. In the rabbit, the effects of the arsenic on the stomach and intestines, were usually less than in carnivorous animals.

The action of the arsenic on the system is less simple than that of the majority of vegetable poisons. As it acts on different organs, it occasions different orders of symptoms; and, as the affection of one or another organ predominates, so there is some variety in the symptoms produced even in individual animals of the same species.

In animals killed by arsenic, the blood is usually found fluid in the heart and vessels after death, but, otherwise, all the morbid appearances met with on dissection, are confined to the stomach and intestines. As this is the case, and as the affection of these organs occasions remarkable symptoms, it may be right to mention the result of my observations on this subject.

Experiments with the Muriate of Barytes.—When barytes is taken into the stomach, or applied to a wound, it is capable of destroying life; but, when in its uncombined state, its action is very slow. The muriate of barytes, which is much more soluble than the pure earth, is (probably on this account) a much more active poison.

On the Effects of the Emetic Tartar.—The effects of the emetic tartar so much resemble those of arsenic and of muriate of barytes in essential circumstances, that it would be needless to enter into a detail of the individual experiments made with this poison.

On the Effects of the Corrosive Sublimate.—When this poison is taken internally in very small and repeated doses, it is absorbed into the circulation, and produces on the system those peculiar effects which are produced by other preparations of mercury. If it passes into the circulation in larger quantity, it excites inflammation of some part of the alimentary canal, the termination of which may vary, accordingly as it exists in a greater or less degree. When taken in a larger quantity still, it occasions death in a very short space of time. I had found, that, if applied to a wounded surface, it produced a slough of the part to which it was applied, without occasioning any affection of the general system. This led me to conclude, that the effects of it, taken internally and in a large quantity, depended on its local action on the stomach, and were not connected with the absorption of it into the circulation.

That a sudden and violent injury of the stomach should be capable of thus speedily proving fatal, is not surprising, when we consider the powerful sympathy between it and the organs on which life more immediately depends, and the existence of which many circumstances in disease daily demonstrate to us.

The facts which have been stated, appear to lead to the following conclusions respecting the action of the mineral poisons which were employed in the foregoing experiments.

1. Arsenic, the emetic tartar, and the muriate of barytes, do not produce their deleterious effects until they have passed into the circulation.

2. All of these poisons occasion disorder of the functions of the heart, brain, and alimentary canal; but they do not all affect these organs in the same relative degree.

3. Arsenic operates on the alimentary canal in a greater degree than either the emetic tartar, or the muriate of barytes. The heart is affected more by arsenic than by the emetic tartar, and more by this last than by the muriate of barytes.

4. The corrosive sublimate, when taken internally in large quantity, occasions death by acting chemically on the mucous membrane of the stomach, so as to destroy its texture; the organs more immediately necessary to life being affected in consequence of their sympathy with the stomach.

In making the comparison between them, we observe that the effects of mineral are less simple than those of the generality of vegetable poisons; and, when once an animal is affected by the former, there is much less chance of his recovery than when he is affected by the latter. *Monthly Mag. June* 1812.

Vaccine Society.

THE Physicians of the Society have continued their attention to the Vaccination of the poor in the city and districts. The number of persons who have passed through the process successfully, under the care of the society, from its first institution in 1809, is as follows:

1809	1102 persons
1810	955
1811	1277
1812	1255
Total	4589

And it is with peculiar satisfaction that we can announce, that, as far as we know, no instance of Small-Pox has occurred in Philadelphia during the present year.

Philadelphia Dispensary.

From the annual Report of the Managers, we find that from December 1, 1811, to December 1, 1812, three thousand, three hundred and sixty-nine patients have been attended by the physicians of this charity.

Remaining under care from last year, . .		70
Admitted since last year, ...		3299
Of whom the number cured is, . .	3098	
relieved, . .	64	
dead, . .	83	
removed, . .	22	
irregular, . .	21	
remaining under care, .	81	
		3369

The receipts of moneys by the institution during the year, including last year's balance in the treasurer's hands, have been, . . . Dolls. 6098 07

The expenditures have been,	Dolls. 6060 57	
Balance in treasurer's hands, Dec. 22, 1812.	37 50	
		6098 07

METEOROLOGICAL OBSERVATIONS.

State of the weather, &c. at Philadelphia, during the last six months of 1812.

JULY.

Thermometer—Lowest, at 8 A. M. 60, 1st day of the month.
Highest, at 3 P. M. 83, 6th.
Mean, ... 72.

Winds—Westerly winds prevailed.

A pleasant month, cool, and very fine harvest—as to the quantity and quality of the grain, and well got in.

AUGUST.

Thermometer—Lowest, at 8 A. M. 60, 27th and 28th days of the month.
Highest, at 3 P. M. 80, 21st.
Mean, ... 70.

Winds—Easterly winds most prevalent.

August, like the two preceding summer months has been remarkably cool—the summer in general has been remarked by a careful observer to be the coolest he has remembered during a long life—the mercury never having rose above 83 degrees—whereas it generally rises to about 90 degrees more or less—some heavy rains in this month. A most violent and destructive hurricane at New Orleans on the 19th day of this month.

SEPTEMBER.

Thermometer—Lowest, at 8 A. M. 49, 21st day of the mo.
Highest, at 3 P. M. 77, 14th.
Mean, ... 60.

Winds variable—mostly northerly.

The weather uniformly cool and moderate,—little rain,—fires kept in the last week,—no equinoctial gale.

OCTOBER.

Thermometer—Lowest, at 8 A. M. 40, 9th day of the month.
Highest, at 3 P. M. 71, 2d and 3d.
Mean, ... 54.

Winds—Southerly and westerly.

The weather has been temperate,—not much rain.

NOVEMBER.

Thermometer—Lowest, at 8 A. M. 28, 25th day of the mo.
Highest, at 3 P. M. 63, 5th.
Mean, ... 40.

Winds—Westerly.

Weather cool,—little rain,—a violent storm from the south-east in the night of the 23d and morning of the 24th—the wind suddenly changed to northwest, and blew with a force seldom experienced.—Many newly built houses and many chimnies were blown down. On the eleventh day of this month a severe shock of an earthquake was experienced at Kingston in Jamaica.

DECEMBER.

Thermometer—Lowest, at 8 A. M. 23, 12th, day of the mo.
Highest, at 3 P. M. 48, 4th.
Mean, ... 30.

Winds—Westerly winds uncommonly prevalent.

A small quantity of snow on the 9th. Floating ice in the river on the 15th and 17th and considerable obstruction to navigation from ice in the last week of this month. Scarcely any rain for four weeks.

For the last six months of the year, the city has been healthy. In the latter part of the summer and beginning of autumn, a Typhus Fever has been very prevalent in the country, chiefly in Chester county, which often proved mortal. The Small-Pox has not been known in this city for the last twelve months.

RECENT BRITISH PUBLICATIONS.

Physiological Reflections on the Destructive Operation of Spirituous and Fermented Liquors on the Animal System. By J. Forster. 2*s.* 6*d.*

Treatise on the Influence of Climate on the Human Species. By D. Petta. octavo.

An Explanation of the Cause why Vaccination has sometimes failed to prevent Small-Pox; and also the Description of a Method confirmed by Experience of obviating such Causes. By Edward Leese. 8vo. 2*s.* 6*d.*

Pharmacologia; or the History of Medical Substances, in order to enable the Practitioner to prescribe them with efficacy

and elegance, and to dispense them with accuracy. By John Ayrton Paris, M. B. F. L. S. 12mo. 8*s*.

Elements of Agricultural Chemistry, in a Course of Lectures delivered before the Board of Agriculture. By Sir Humphrey Davy. Illustrated with Plates, engraved by Laurie.

Observations on the Nature and Treatment of Tinea Capitis, or Scald Head; and on Impaired Vision arising from Opacity of the Cornea. By Thomas Luxmoore.

Description of the Arteries, with copious Notes. By John Barclay, M. D. &c.

A Treatise on the Dolichos-Pruriens. By Chamberlaine. 10th edition.

Tirocinium Medicum, on the Duties of Youth in the Prosecution of their Studies in the Medical Profession.

A Series of Plates on the Brain, with References exhibiting the appearance of that Organ in the different Stages of Dissection. By Alexander Ramsay, M. D. Edinburgh. 4to. 1*l*. 1*s*.

Outlines of Natural Philosophy; being Heads of Lectures delivered in the University of Edinburgh. By John Playfair, Professor of Natural Philosophy in the University of Edinburgh. 1 vol. 8vo. 9*s*.

On the Uncertainty of the Signs of Murder in the Case of Bastard Children. By J. Hunter. 1*s*. 6*d*.

Practical Observations on the Ectropium or Eversion of the Eyelids, with the Description of a new Operation for the Cure of that Disease. By William Adams. Illustrated by coloured Plates. 8vo. 14*s*. boards.

A Treatise on Veterinary Medicine. By James White, of Exeter, late Veterinary Surgeon to the First or Royal Dragoons. The third vol. 12mo. 6*s*.

Remarks on Baths, Water, Swimming, Shampooing, Heat, Hot, Cold and Vapour Baths. By M. L. Este, Esq. 3*s*. 6*d*. sewed.

Synopsis Plantarum Succulentarum. By W. Haworth, cr. 8vo. 10*s*. 6*d*.

Count Rumford's seventeenth and eighteenth Essays; the first on the Source of Light which is manifested in the Combustion of Inflammable Bodies. 1*s*. The other on the excellent Qualities of Coffee, and the Art of making it in the highest perfection. 4*s*.

An Essay on the Influence of Tropical Climates, particularly that of India, on European Constitutions: the principal Effects and Diseases induced thereby; with the means of obviating and removing them. By Joseph Johnson, Esq. Surgeon in the Royal Navy.

A Botanical Materia Medica; consisting of the Generic and Specific Characters of the Plants used in Medicine and Diet, with Synonyms and References to Medical Authors. By Jonathan Stokes, M. D. 4 vols. octavo. 3*l*.

PROPOSED BRITISH PUBLICATIONS.

Dr. Alexander Monro, jun. has in the Press, Outlines of the Anatomy of the Human Body, in its sound and diseased state, in three octavo volumes. Illustrated by forty-four Engravings. By Heath, Mitchell, &c. from original Drawings of Dr. Peter Camper, Messrs. Fyfe, Syme, and Lezars.

Fauna Orcadensis, or the Natural History of the Quadrupeds, Birds, Reptiles, and Fishes, of Orkney and Shetland. By the Rev. G. Low, Minister of Biza and Harzy, is printing in quarto.

Engravings from Specimens of morbid parts of the Urethra, &c. preserved in Mr. Charles Bell's Collection, Windmill Street, are nearly ready for publication, and will appear in four fasciculi, of ten Plates each, in folio.

The African Institution intend to publish the last Journals received from Mr. Park, with the Narrative of Isaac his companion, for the Benefit of Mr. Park's widow.

RECENT AMERICAN PUBLICATIONS.

Professor Cullen's Treatise of the Materia Medica, with large additions, including many new articles wholly omitted in the original work. By Benjamin Smith Barton, M. D. one of the physicians to the Pennsylvania Hospital, and Professor of Materia Medica, Natural History, and Botany, in the University of Pennsylvania. 2 vols. 8vo. E. Parker, Philadelphia.

Medical Inquiries and Observations upon the Diseases of the Mind. By Benjamin Rush, M. D. Professor of the Institutes and Practice of Medicine, and of Clinical Practice, in the University of Pennsylvania. 1 vol. 8vo. Kimber and Richardson, Philadelphia.

Elements of Chemical Philosophy. By Sir Humphrey Davy, LL. D. Sec. R. S. Prof. Chem. R. I. & B. A. M. R. I. F. R. S. E. M. R. I. A. Member of the Royal Academy of Stockholm; of the Imp. Med. & Chir. Academy of St. Petersburgh; of the American Philosophical Society; and Honorary Member of the Societies of Dublin, Manchester, the Physical Society, and the Medical Society of London. Part 1. vol. 1. Bradford & Inskeep, Philadelphia.

The Philosophy of Experimental Chemistry. By James Cutbush, Professor of Chemistry, Mineralogy, and Natural Philosophy in St. John's College, Annapolis, President of the Columbian Chemical Society, &c. &c. 2 vols. 12mo. Isaac Peirce, Philadelphia.

Engravings of the Arteries; illustrating the Anatomy of the Human Body, and serving as an introduction to the Surgery of the Arteries. Consisting of twelve handsomely coloured Plates, and eighty pages letter-press Explanations. By Charles Bell. royal 8vo. Anthony Finley, Philadelphia.

The Theory of Agreeable Sensations; in which the Laws observed by Nature in the distribution of Pleasure are investigated, and the principles of Natural Theology and Moral Philosophy established. Anthony Finley, Philadelphia.

A System of Operative Surgery, founded on the Basis of Anatomy. By Charles Bell. 2 vols. royal 8vo. Hale & Hosmer, Hartford, Conn.

PROPOSED AMERICAN PUBLICATIONS.

Thomas Dobson, has in press, Cavallo's Elements of Natural Philosophy; condensed and improved by the Rev. F. X. Brosius.

Kimber & Richardson, propose to publish, A Treatise on the Diseases of the Eye. By J. Saunders.

Isaac Pierce, has in press, Memoirs of the Columbian Chemical Society. vol. first.

Kimber & Conrad, and Edward Parker, intend putting to press the ensuing spring, Elements of Surgery, for the Use of Students: with Engravings. By John Syng Dorsey, M. D. Adjunct Professor of Surgery in the University of Pennsylvania, and one of the Surgeons to the Pennsylvania Hospital.

בראשית

LIBER GENESIS.

CAPUT I. א

1 בראשית ברא אלהים את השמים ואת הארץ: א נרנחי
2 והארץ היתה תהו ובהו וחשך על פני תהום ורוח
3 אלהים מרחפת על פני המים: ויאמר אלהים יהי
4 אור ויהי אור: וירא אלהים את האור כי טוב ויבדל
5 אלהים בין האור ובין החשך: ויקרא אלהים ה
לאור יום ולחשך קרא לילה ויהי ערב ויהי בקר יום
אחד: פ

1 Deus creat cœlum et terram.

3 Creat lucem, ac distinguit inter lucem et tenebras.

6 ויאמר אלהים יהי רקיע בתוך המים ויהי מבדיל בין
7 מים למים: ויעש אלהים את הרקיע ויבדל בין המים
אשר מתחת לרקיע ובין המים אשר מעל לרקיע ויהי
8 כן: ויקרא אלהים לרקיע שמים ויהי ערב ויהי בקר
יום שני: פ

6 Creat expansum, et separat aquas inferiores à superioribus.

9 ויאמר אלהים יקוו המים מתחת השמים אל מקום
אחד ותראה היבשה ויהי כן: ויקרא אלהים ליבשה
ארץ ולמקוה המים קרא ימים וירא אלהים כי טוב:
11 ויאמר אלהים תדשא הארץ דשא עשב מזריע זרע עץ
פרי עשה פרי למינו אשר זרעו בו על הארץ ויהי כן:
12 ותוצא הארץ דשא עשב מזריע זרע למינהו ועץ עשה
13 פרי אשר זרעו בו למינהו וירא אלהים כי טוב: ויהי
ערב ויהי בקר יום שלישי: פ

9 Aquæ confluunt in unum locum. Terra apparet et producit fructus.

14 ויאמר אלהים יהי מארת ברקיע השמים להבדיל בין
היום ובין הלילה והיו לאתת ולמועדים ולימים ושנים:
והיו למאורת ברקיע השמים להאיר על הארץ ויהי כו
16 כן: ויעש אלהים את שני המארת הגדלים את
המאור הגדל לממשלת היום ואת המאור הקטן
17 לממשלת הלילה ואת הכוכבים: ויתן אתם אלהים
ברקיע

14 Deus creat luminaria in expanso.

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March 5th, 1812.

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